



Presented at the 2026
IPA World Conference
in Christchurch,
New Zealand

The Child's Right to Play

IPA USA 2026 White Paper
Accessible Version: Part 10

USA



*American Association for
the Child's Right to Play*

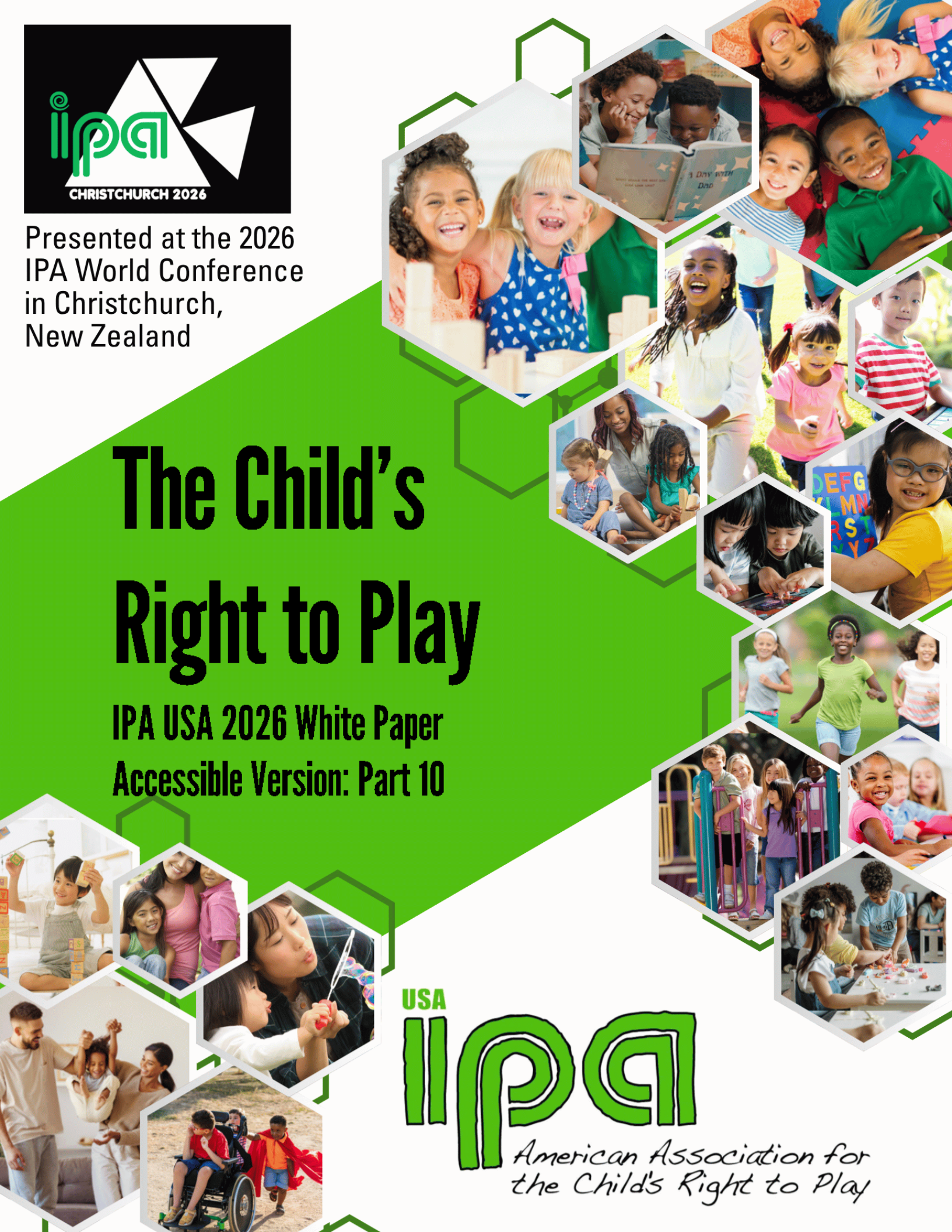


Table of Contents

Table of Contents.....	2
Executive Summaries	3
Play in the Age of Algorithms	4
White Papers	21
Play in the Age of Algorithms	22

Executive Summaries

Executive Summaries are organized by category, followed by author.



USA
iipa
*American Association for
the Child's Right to Play*

Play in the Age of Algorithms

Children today are growing up in a world increasingly shaped by screens, algorithms, artificial intelligence, and digital technologies that compete for their attention, influence their choices, and mediate their experiences. While technology offers new opportunities for connection, learning, and entertainment, it also raises important questions about children's development, well-being, relationships, and opportunities for authentic play. The articles in this category explore how digital technologies affect children's brains, behavior, learning, and family life, and what may be lost when screen-based experiences replace child-initiated play. From the influence of algorithms and artificial intelligence to the role of parents in restoring balance, these authors provide research, practical strategies, and critical perspectives that help readers navigate the challenges of modern childhood. Together, they reinforce a powerful message: as technology becomes increasingly integrated into daily life, protecting time, space, and opportunities for rich, meaningful play is more important than ever for healthy development and human flourishing.

Authors

How Our Brains Develop Through Play, and What Happens When Screens Get Involved

Chima Abimbola Eden, MSc & Opeoluwa Ihediohia, MEd, BEd

Is Digital Play Really Play? Prioritizing Offline Play in a Commercialized World

Rachel Franz, MEd

Screens, Play, and the Developing Brain: Restoring Balance in Modern Childhood

Celia Hogan, Nature Education Specialist

Playful Parents in Technoference Times

Miriam McCaleb, PhD

**Let's Grow Brain P.O.W.E.R.! What Kids REALLY
Need to Thrive and How Screens Interfere**

Katie Talarico, MEd

The Algorithm in the “Toy Box”: Navigating AI, Play, and Culture

Jessie Ming Sin Wong, PhD

How Our Brains Develop Through Play, and What Happens When Screens Get Involved.

Chima Abimbola Eden, MSc & Opeoluwa Ihediohia, MEd, BEd

Introduction

Today's children are born into a digital age and can swipe a screen before they learn to walk. This is a significant shift in kids' development as they begin to learn, play, and connect online. As they grow up, these kids have unprecedented access to screens. They see screens first, feel screens first, and hear screens first, unlike any generation before them.

The young child's brain, with its tremendous plasticity, is particularly sensitive to environmental forces, including those conveyed through digital media (Hutton et al., 2020). Neuroplasticity has two sides: toddlers can quickly learn to use digital interfaces, but they are also vulnerable to the negative effects of excessive screen time. Parents, educators, and pediatric providers need to understand the competing pressures and challenges of balancing effective technology use with practices that support healthy development.

Studies have shown that digital media can be toxic to cognitive functioning, social connection, and behavioral adaptation (Paulus et al., 2019). Children's screen-time choices today will shape how an entire generation develops and relates to technology.

Conclusion/Recommendations

The connection between screen time and childhood development is complex and requires a nuanced approach rather than quick solutions. Research and technology offer significant advances in learning and cognition, but excessive and inappropriate use of technology poses dangers to a developing brain. Instead, the answer is not to erase technology but to highlight approaches with evidence of success and the potential to reduce harm.

Primary Recommendations

For Parents:

- Decide on screen time quality over quantity; prioritize educational, interactive content, not passive entertainment
- Establish regular limits of screen time with zones and no-screen-time intervals
- Deliver incremental educational value and relational connection through co-viewing experiences on STEM content
- Work to ensure that the time they spend on screens is balanced by active exercise and outdoor activities that include social interaction.
- Set and maintain a good example of responsible technology use and hold family discussions about becoming responsible digital citizens.

For Educators:

- Using technology in a meaningful, curricular way. Technology should complement core experiences rather than replace them
- Build in real-life experiences with opportunities to talk with people to complement online learning
- Collaborate with parents and teach them about educational technology

For Policymakers:

- Fund research so we can examine how, in the long term, exposure to screens will affect the development of children
- Establish evidence-based guidelines on the proper usage of educational technology in schools
- Develop public awareness campaigns for healthy screen time use.
- Provide high-quality educational materials and digital literacy resources for all kids.

Future Considerations:

Given the fast-paced advancements in technology, continuous research and guideline updates are essential. Emergent technologies such as virtual reality and artificial intelligence will require further research into the developmental impacts. Longitudinal studies at scale, starting at such a young age and following participants into adulthood, will be key to understanding potential long-term effects of digital childhood on the life course.

The goal should be to cultivate a generation of individuals who can leverage technology while maintaining cognitive flexibility, social skills, and emotional intelligence necessary to thrive in a complex world. This can only be achieved through the collaborative efforts of parents, educators, health professionals, and policymakers to create healthier digital environments that future generations will be grateful for.

With a focus on empirically supported tactics and a willingness to learn from fresh evidence as it surfaces, we can help kids find a healthy relationship with technology, and one to last a lifetime. Let us be sure the screen generation is not also the sacrifice generation. Let us support this generation in possessing the keys to a grounded integration of digital and analog learning that will produce the widest range of development in this digital-human life.

Is Digital Play Really Play? Prioritizing Offline Play in a Commercialized World

Rachel Franz, MEd

Introduction

Child development experts agree that the best practices in supporting young children's development are infused with child-led play. When educators provide children with the time and space to play with rich, open-ended materials and opportunities to connect with peers and trusted adults, children thrive. As children play, responsive caregivers follow children's interests, scaffold their experiences, celebrate their unique identities, and cultivate culturally responsive environments. This type of play— indoors and outdoors— meets young children's social, biological, and cognitive needs and is a critical part of childhood (National Institute of Play, n.d.).

Yet, there is a growing, powerful narrative that young children *need* technology early and often to thrive in our increasingly digital world; some scholars even argue that using tablets must be included as part of preschoolers' daily routine in order for educators to be responsive and culturally relevant (Chu et al., 2024; Rogow, 2023). Families have bought in on the need for early technology use, and a majority believe that their children need technology to learn and develop successfully (Fairplay, 2025). Another survey found that parents of young children believe that their children learn better from educational apps than hands-on toys (Radesky et al., 2016). Schools and popular childcare standards require educators to engage children with digital devices (NAEYC, 2020). And some researchers have added “digital play” to the list of different forms of long-recognized, evidence-based play types (Chu et al., 2024).

Conclusion/Recommendation

While “digital play” continues to gain traction, we must recognize that digital platforms are not neutral tools; corporate environments put profit over kids. If we don't, we risk displacing the child-led, hands-on play that children need by exposing them to harmful manipulative design tactics and content. To protect children's well-being and

right to play, we need to reject the false equivalence of digital play and reclaim early childhood settings as play sanctuaries to truly ensure that all children can thrive.

Screens, Play, and the Developing Brain: Restoring Balance in Modern Childhood

Celia Hogan, Nature Education Specialist

Introduction

Children's daily environments have changed dramatically over the past decade. Across many countries, children are spending more time engaged with digital devices and significantly less time participating in free, imaginative, and outdoor play. While digital technology offers benefits, increasing evidence suggests that excessive screen exposure, particularly in early childhood, can affect sleep, attention, emotional regulation, and social development.

At the same time, opportunities for play, movement, and exploration have declined. Research from neuroscience, psychology, and education shows that these experiences are critical for healthy brain development. Through play, children develop executive function, resilience, creativity, empathy, and the ability to regulate emotions and manage risk.

This white paper examines current research on the developmental impacts of screen exposure and the role of play in supporting healthy brain development. Drawing on international studies and practical examples from play-based programs, it highlights the growing imbalance between digital engagement and real-world play experiences.

The paper concludes that restoring balance in modern childhood does not require eliminating technology, but ensuring that children continue to experience the types of play that support their development. Recommendations focus on protecting time for free play, expanding access to nature-based play, supporting healthy screen habits, strengthening relationships, and designing learning environments and communities that prioritize play-rich childhoods.

Childhood is changing at a pace no generation has experienced before. Over the past decade, screens have shifted from being an occasional part of children's lives to an everyday presence woven into home, school, and social environments. At the same time, opportunities for free, imaginative, active, and outdoor play have steadily declined

[Return to Table of Contents](#)

(Gray, 2011, 2013). Many children now spend more time sitting, watching, and swiping than exploring, creating, and connecting with others face-to-face (Rhodes et al., 2022).

From a New Zealand perspective, these trends mirror what is being observed internationally: Rising screen use across all ages, declining outdoor play, increased sedentary behavior, and growing concerns about children's well-being (Rhodes et al., 2022; Royal Children's Hospital National Child Health Poll, 2024). Neuroscience shows that these shifts matter. The developing brain relies on movement, rich sensory input, relationships, and unstructured play to build the neural pathways that support attention, emotional regulation, empathy, and resilience (Radesky & Christakis, 2023).

Research now links high screen exposure, particularly in early childhood, with challenges in sleep, attention, self-regulation, and social development (Domoff et al., 2020; Madigan et al., 2019; Radesky & Christakis, 2023). For older children and adolescents, heavy use of smartphones and social media is associated with increased anxiety, loneliness, and mood difficulties (Haidt & Rausch, 2026; Kelly et al., 2025; Twenge, 2020).

Alongside these concerns, a strong evidence base highlights the protective power of play. When children climb, imagine, negotiate, take risks, and explore natural or social environments, they strengthen the very skills and capacities that digital experiences often displace (Prins et al., 2022; Sandseter et al., 2021; Sandseter & Kleppe, 2024).

This paper explores what current research reveals about these contrasting developmental pathways and how families, educators, and communities can help restore balance in a digital age.

Conclusion/Recommendations

Children's developmental environments have changed rapidly, and the rise of digital technologies has outpaced our understanding of their impact on young minds (Radesky & Christakis, 2023). At the same time, opportunities for free, active, imaginative play have declined worldwide (Gray, 2011; Haidt, 2024). Research across neuroscience, psychology, education, and public health shows that this shift is not

neutral: Chronic screen exposure and reduced play affect attention, self-regulation, emotional well-being, and the development of core skills children rely on throughout life (Domoff et al., 2020; Madigan et al., 2019; Twenge, 2020).

Yet the evidence also presents a clear pathway forward. Play, particularly unstructured, social, and nature-based play, offers powerful protective benefits (Prins et al., 2022; Sandseter et al., 2021). It supports healthy brain development, fosters resilience, and builds the cognitive and emotional skills that help children thrive in an increasingly complex world (Ernst, 2024; McDonnell et al., 2024).

When families, educators, and communities create environments where play is prioritized and digital engagement is balanced and intentional, children experience measurable improvements in well-being and development (Warburton et al., 2022).

By restoring play to the center of childhood and guiding screen use with intention, we can help children grow up with the capacities, confidence, and connection they need to flourish.

Playful Parents in Technoference Times

Miriam McCaleb, PhD

Introduction

It is a sad reality that not everyone understands the value of play as a conduit for learning and wellbeing (Bipath et al., 2022). As an advocate for children, an early childhood teacher, and a child development researcher, I have always found it necessary to help some parents understand what children's play means.

This might include explaining, in developmental terms, the value of children's play. Sadly, in this outcome-focused, hyper-busy, maximization-obsessed time in which we live (Paine, 2023), there is apparently more need than ever to justify play. It seems to have become necessary to explain not only the benefits of play but also to clarify its definition as spontaneous, hands-on, and child-led.

Those who work with children and families must learn to communicate how a child's development is fostered when they participate in building a fort, the skills a child develops when they build with blocks or model with clay, and how creative play prepares the brain for adulthood.

Having worked in this realm for more than 30 years, I find nothing new in this need to promote child literacy – that is, to support adults in becoming more literate and knowledgeable about children and explaining the "why" of play. Unfortunately, what is new is the number of people who seem to require such support in the "how" of play.

Given the vital role of play in encouraging responsiveness and fostering warm, reciprocal connections between children and adults (Silton et al., 2026), support for parents in recognizing the role that serve-and-return interactions have in fostering healthy neurobiological growth is essential. Such serve-and-return interactions are exemplified in playful exchanges between the youngest babies and their loving families (Komanchuk, Letourneau, et al., 2023).

Into this already compromised play landscape, there is a new threat: the Great Distractor. Nowadays, use of smartphones is ubiquitous (Morris et al., 2022):

[Return to Table of Contents](#)

distracting parents and displacing playtime (Hiniker et al., 2015; Lemish et al., 2020), and the downsides are mounting.

Conclusion

Technoference is a risk to an optimal parent-child connection, and a distraction from IRL. By supporting parents and demanding safer digital and physical environments, we can - and must - promote the vital role of play, with life-enhancing benefits for the next generation.

Let's Grow Brain P.O.W.E.R.! What Kids REALLY Need to Thrive and How Screens Interfere

Katie Talarico, MEd

Introduction

Parenting in the digital age is difficult. Maintaining consistent rules is exhausting, and screen time battles feel inevitable. Devices are hard for families to manage. The truth is that parents today are tasked with an impossible feat: to MANAGE the UNMANAGEABLE. Most screen-based activities for children (and adults) have been purposefully designed to be unmanageable: to capture and hold their attention hostage, and to override their best intentions.

These purposeful design features, in combination with well-financed marketing departments, have steered screens into a role of perceived necessity and inevitability in childhood - without proof of benefit. At the same time, an ever-growing body of independent research shows significant harms to the health and well-being of children who overuse screens. Parents are inundated with conflicting messages.

Many advocates are working tirelessly for change through legislation and policies that protect children online, push companies to create safer products for children, and hold companies accountable for harms they cause. However, this is a slow process, and parents are still on the front line, protecting and guiding their children through the digital world. Families need solutions!

On the bright side, research also shows extraordinary benefits to children's development from simple and time-honored activities like play, outdoor time, chores, engaging with others, and reading. We must push back on the assumption that screen time is necessary and inevitable for learning and growth, and strive to bring healthy development back to the center of childhood.

Let's Grow Brain P.O.W.E.R.! aims to do both. Research shows that parents are more receptive to positively framed messages about screen time than to negatively framed, or fear-based, messages (Fairplay, 2025). The Let's Grow Brain P.O.W.E.R.! framework shifts the focus to healthy development, or in other words, what children

really need to grow and thrive. P.O.W.E.R. is an acronym that highlights healthy developmental activities that provide children opportunities to build the *human skills* they will need in the future.

P- Play

O- Outdoors

W- Work/Chores

E- Engage (with others)

R- Read

When children spend more time on these healthy, screen-free activities, they not only reap the extraordinary benefits these simple activities offer for growing brains and bodies, but they also have less time each day for screens. MORE BRAIN P.O.W.E.R. TIME = LESS SCREEN TIME!

Let's Grow Brain P.O.W.E.R.! offers a simple, memorable framework of shared language that prioritizes healthy child growth and development, gives families a roadmap to healthy development, and educates families about how screen time interferes.

Conclusion

Screen-based activities will never provide as much learning as three-dimensional, sensory-rich, synchronous, and in-person activities. The P.O.W.E.R. activities: play, outdoor time, work/chores, engaging with others, and reading, lead children into the three-dimensional, sensory-rich physical world and allow them to practice the human skills that will help them in the future.

Screen overuse is interfering with children's healthy development, including physically, mentally, socially, emotionally, cognitively, and academically. Giving a child a device might calm and entertain them in the moment, but it also displaces the real-life learning children need to grow and thrive. Families receive conflicting information about screen time and are often unsure of how to proceed. We must provide families with a path forward without blame or shame. When families include more P.O.W.E.R.

activities in the day, screen time will naturally be reduced. Small changes can have a big impact on development. As families learn about how screen time affects their growing child, they can make more changes when they are ready.

Let's Grow Brain P.O.W.E.R.! provides a simple, memorable framework that promotes healthy developmental activities, encourages healthy change, and explains how screen overuse interferes. Let's Grow Brain P.O.W.E.R.!

The Algorithm in the “Toy Box”: Navigating AI, Play, and Culture

Jessie Ming Sin Wong, PhD

Introduction

Toys are a universal and essential part of childhood. They are tools of play, props for imagination, and objects through which children make sense of their world. Foundational theories of development demonstrate that object play is not just common but essential for cognitive growth. Toys serve as critical pivots for developing abstract thought and are the primary instruments through which children build symbolic understanding (Piaget, 1962; Vygotsky, 1978). The right toys, introduced at the right time, can promote healthy development and create rich learning opportunities (Dauch et al., 2018).

For millennia, these toys remained relatively constant. They were dolls, blocks, and balls, crafted from wood, clay, and rock (Chrisp, 1996). Today, the “toy box” looks very different. We have entered the era of the “smart toy,” an era where playthings can listen, respond, learn, and connect to the internet. Artificial intelligence (AI) has moved from research labs into our children’s playrooms as interactive robots, adaptive learning games, and voice-activated companions (Holmes et al., 2019; Lee et al., 2024; Su & Yang, 2022). These new toys offer incredible promise, with the ability to personalize experiences and foster new skills (Snoopplay, 2024). They also introduce profound new challenges that touch upon the very culture of childhood. This white paper explores the complex relationship between AI, play, and culture, offering guidance for parents and educators to navigate this evolving landscape thoughtfully and protect every child’s right to meaningful play.

Conclusion/Recommendations

AI is a powerful new force in the world of play. It can offer children personalized, engaging, and educational experiences that were unimaginable a generation ago. However, without careful guidance and critical oversight, these same technologies risk promoting a homogenized global culture, replacing vital human relationships, and compromising a child’s fundamental right to privacy. The path forward is not to ban

these new tools, but to engage with them wisely. We must shift the conversation from what a toy can do to what it *ought* to do in the service of a child's holistic development.

To ensure that AI serves play, and not the other way around, this white paper offers the following recommendations:

1. ***For parents and caregivers:*** Embrace your role as a media mentor and culture curator. Actively choose toys that reflect your family's values, play alongside your child to guide his or her experience, and champion a balanced diet of play that prioritizes social, outdoor, and imaginative activities.
2. ***For educators:*** Integrate technology with clear pedagogical goals. Use AI as a tool to support learning, not as a replacement for teacher-led instruction. Model critical thinking by discussing with students how these tools work and the biases they might contain.
3. ***For the toy industry:*** Adopt an "ethics by design" approach. Prioritize children's developmental needs and cultural affirmation over engagement metrics. Provide radical transparency in privacy policies and give parents meaningful control over their children's data.
4. ***For play advocates and policymakers:*** Champion stronger, clearer regulations that protect children's data and hold companies accountable for algorithmic bias. Support the development of independent rating systems that can help parents evaluate the ethical and cultural quality of smart toys.

The "toy box" has changed forever. It is our collective responsibility to ensure that even as toys become smarter, our approach to play remains wise, humane, and dedicated to the flourishing of every child.

White Papers



USA
iipa
*American Association for
the Child's Right to Play*

Play in the Age of Algorithms

[How Our Brains Develop Through Play, and What Happens When Screens Get Involved](#)

[Is Digital Play Really Play? Prioritizing Offline Play in a Commercialized World](#)

[Screens, Play, and the Developing Brain: Restoring Balance in Modern Childhood](#)

[Playful Parents in Technoference Times](#)

[Let's Grow Brain P.O.W.E.R.! What Kids REALLY Need to Thrive and How Screens Interfere](#)

[The Algorithm in the "Toy Box": Navigating AI, Play, and Culture](#)



USA
ipa
*American Association for
the Child's Right to Play*

How Our Brains Develop Through Play, and What Happens When Screens Get Involved

Chima Abimbola Eden, MSc & Opeoluwa Ihediohia, MEd, BEd

Introduction

Today's children are born into a digital age and can swipe a screen before they learn to walk. This is a significant shift in kids' development as they begin to learn, play, and connect online. As they grow up, these kids have unprecedented access to screens. Unlike any generation before them, they see screens first, feel screens first, and hear screens first.

The young child's brain, with its tremendous plasticity, is particularly sensitive to environmental forces, including those conveyed through digital media (Hutton et al., 2020). Neuroplasticity has two sides: toddlers can quickly learn to use digital interfaces, but they are also vulnerable to the negative effects of excessive screen time. Parents, educators, and pediatric providers need to understand the competing pressures and challenges of balancing effective technology use with practices that support healthy development.

Studies have shown that digital media can be toxic to cognitive functioning, social connection, and behavioral adaptation (Paulus et al., 2019). Children's screen-time choices today will shape how an entire generation develops and relates to technology.

Problem Statement - Issues

Children's use of digital technology has become widespread, posing new challenges for parents. Additionally, a range of developmental issues has surfaced, including cognitive, social, emotional, and physical development.

Cognitive Development Concerns: "The Cognitive Impact of Video Game Culture."

As one might assume, the effects on cognitive development are vast, especially for motivationally and attentionally demanding tasks (Paulus et al., 2019). The frenetic speed of digital information teaches the brain to become intolerant of the quieter, less

stimulating pace of reality. Many children with constant, high exposure to screens struggle with tasks that require sustained attention, such as creativity, critical thinking, and problem-solving.

Digital multitasking hinders memory consolidation and learning as children switch between applications and tasks. Shanmugasundaram, M., & Tamilarasu, A. (2023). This fragmented attention pattern can hinder the brain's ability to process and retain information effectively, potentially impacting academic performance and long-term learning outcomes. Vedeckina, M., & Borgonovi, F. (2021).

Social and Emotional Development Challenges

Screens also reduce social interaction with peers, which is crucial for learning social skills such as reading nonverbal cues and empathy. Children who spend too much time staring at screens often struggle to build successful relationships and interact face-to-face; this can affect their connection with others. Mee, R. W. M., Harun, N. H., Pek, L. S., Mohamed, S., Shahdan, T. S. T., & Ahmad, A. (2024). A dose of one-upmanship: Exposure to these fabricated social media posts may exacerbate feelings of inferiority and fear among kids as they try to live up to the example their friends set. The possibility of victimization, cyberbullying, and inappropriate content compounds the challenges of the online world, which can manifest in emotional and behavioural difficulties. Albino, D. (2021).

Physical Health and Sleep Disruption

Excessive screen time leads to sedentary behavior and reduced physical activity, and it reduces the time clients have to participate in active hobbies (Hutton et al., 2019). Blue light emitted by screens disrupts natural sleep cycles, worsening cognitive and emotional difficulties.

The Play Deficit Crisis

Play is a natural process that helps a child become aware, think, and imagine, but screen time has reduced and replaced it. This shift represents a significant loss because unstructured play stimulates the prefrontal cortex, builds problem-solving skills, and strengthens emotional regulation. Less physical and imaginative play limits children's

opportunities to develop essential executive functions and social skills that digital interfaces cannot replace.

Background

The brain continues to develop during the formative years of human life, and neuronal connections develop rapidly in the early years. This rapid development of neuronal connections is marked by vulnerability, but it also represents a window of opportunity because environmental input largely shapes neuronal architecture (Shonkoff & Phillips, 2000).

Typical experiences during development, like touch, movement, and socialization, expose us to a rich, varied multisensory environment that we need to develop a normal-functioning brain. Digital screens have altered the developmental landscape.

The Evolution of Screen Exposure

Children's screen time today involves a variety of devices and content, each with different impacts on child development. Alpuğan, Z. (2024). People use screens and speakers largely passively today, and interactivity is already a bigger part of life than sitting in front of a TV (which is no longer the only place to watch TV, thanks to smartphones, tablets, and laptops). They provide access to entertainment, educational content, social media, and games, which can be both good and bad.

Screen exposure is unprecedented, with frequent, often lifelong exposure to multiple screens since infancy in developed countries. Qi, J., Yan, Y., & Yin, H. (2023). Technology in curricula has increased student exposure at the institutional level.

The Neuroscience of Digital Interaction

Playing digitally engages parts of the brain that other activities do not. Bateman, C., & Nacke, L. E. (2010, May). The visual processing areas are engaged, and information swapping is in full swing, which may enhance visual-spatial processing and hand-eye coordination. These interactions might not fully engage brain regions responsible for deep thinking, empathy, and reaching thoughtful conclusions.

“There are instant feedback loops in digital media where dopamine gets fired, which is what produces the reward and joy that one wants to do it again. While it may be helpful for learning when suitably guided, overuse is suspected to lead to attentional deficits and apathy.

Appropriate Approaches/Strategies

Quality-Focused Screen Time Management

Screen time should be managed with an emphasis on quality, not merely on prohibiting apps and screen time, as per the screen time guidelines for children. With fewer options, it's even more important to choose interactive educational content that helps children develop their thinking skills. Digital Out-of-Home experiences should encourage active engagement as opposed to behaviour) that stimulates problem-solving, creativity, and cognitive participation.

Well-designed educational software can improve learning outcomes when used. Interactive content responds to children's input and accommodates different learning speeds, offering a more personal and adaptive teaching experience than traditional methods.

Using Regular Breaks and the 20-20-20 Rule

Some screen time is important, and even essential, for brain health. The 20-20-20 rule is to take a 20-second break to view something 20 feet away every 20 minutes to prevent eye strain — it can also provide an important cognitive break.

The extended time with screens should be interspersed with physical movement, outdoor play, or social interaction, “to give your child varied experiences.

Balancing Digital and Traditional Activities

In general, child development is fostered by encouraging activities that combine screen time with traditional, book-based activities, which engage both brain and body systems in unique ways. Physical play, reading physical books, hands-on artistic play, and unstructured exploring give our senses a workout that cannot be fully replicated on a screen.

Promote outdoor physical play and “green time” as an alternative to screen time, providing opportunities for physical activity, sensory experiences, and bonding with the natural world. Such are vital to normal brain development and emotional health, and can prevent injury from toxic stress.

Creating Screen-Free Zones and Times

Limiting screen time creates room for other fun, educational activities and sets boundaries for a good night's sleep. However, screen-free areas, such as family dining and bedrooms, make face-to-face interaction, restful sleep, and good old-fashioned togetherness more possible.

Even zero screen time, especially before bedtime, helps prevent sleep problems caused by blue light exposure. Nurture a mindful pre-sleep ritual that also limits screen time, which is essential for establishing good sleep habits vital to cognitive and emotional development.

Promoting Co-Viewing and Active Engagement

When children co-watch screens with adults, the educational value increases considerably (Zosh, J. M., Gaudreau, C., Golinkoff, R. M., & Hirsh-Pasek, K., 2022). The adult’s presence encourages conversation, explanation, and translation from digital screen to hands-on experience. This shifts the tactile experience of pushing buttons into human interaction. Another way parents can monitor their children's content and talk with them about it is through co-viewing. These shared experiences can strengthen relationships and make the most of screen time.

Supporting Unstructured Play Opportunities

We must support unstructured play to promote healthy brain development (Ginsburg, 2007). Play like this, free from adult direction or digital pressures, lets children exercise their imaginations, problem-solve, and practice dealing with and processing emotions. Playing for free activates the brain's powerful circuits essential for creativity, innovation, and understanding complex emotions, tasks, and situations.

Parents and educators are prompted to deliberately create contexts that allow for unstructured play by organizing opportunities to use open-ended materials, providing an environment that offers both physical and psychological safety for individual exploration, and arranging unscheduled time for activities. These findings matter because such experiences support executive functions and social competence.

Conclusion/Recommendations

The connection between screen time and childhood development is complex and requires a nuanced approach, not quick fixes. Research and technology offer significant advances in learning and cognition, but excessive and inappropriate use of technology poses dangers to a developing brain. Instead, the answer is not to erase technology but to highlight approaches with evidence of success and the potential to reduce harm.

Primary Recommendations

For Parents:

- Decide on screen time quality over quantity; prioritize educational, interactive content, not passive entertainment
- Establish regular limits of screen time with zones and no-screen-time intervals
- Deliver incremental educational value and relational connection through co-viewing experiences on STEM content
- Work to ensure that the time they spend on screens is balanced by active exercise and outdoor activities that include social interaction.
- Set and maintain a good example of responsible technology use and hold family discussions about becoming responsible digital citizens.

For Educators:

- Using technology in a meaningful, curricular way. Technology should complement core experiences rather than replace them
- Build in real-life experiences with opportunities to talk with people to complement online learning
- Collaborate with parents and teach them about educational technology

For Policymakers:

- Fund research so we can examine how, in the long term, exposure to screens will affect the development of children
- Establish evidence-based guidelines on the proper usage of educational technology in schools
- Develop public awareness campaigns for healthy screen time use.
- Provide high-quality educational materials and digital literacy resources for all kids.

Future Considerations:

Given the fast-paced advancements in technology, continuous research and guideline updates are essential. Emergent technologies such as virtual reality and artificial intelligence will require further research into the developmental impacts. Longitudinal studies at scale, starting at such a young age and following participants into adulthood, will be key to understanding potential long-term effects of digital childhood on the life course.

The goal should be to cultivate a generation of individuals who can leverage technology while maintaining cognitive flexibility, social skills, and emotional intelligence necessary to thrive in a complex world. This can only be achieved through the collaborative efforts of parents, educators, health professionals, and policymakers to create healthier digital environments that future generations will be grateful for.

With a focus on empirically supported tactics and a willingness to learn from fresh evidence as it surfaces, we can help kids find a healthy relationship with technology, and one to last a lifetime. Let us be sure the screen generation is not also the sacrifice generation. Let us support this generation in possessing the keys to a grounded integration of digital and analog learning that will produce the widest range of development in this digital-human life.

References

Albino, D. (2021). Social-Emotional Impact of Technology and Virtual Learning on Children During the COVID-19 Pandemic.

[Return to Table of Contents](#)

- Alpuğan, Z. (2024). NAVIGATING THE DIGITAL LANDSCAPE: A COMPREHENSIVE REVIEW OF DIGITAL MEDIA'S IMPACT ON CHILD DEVELOPMENT. *Nişantaşı Üniversitesi Sosyal Bilimler Dergisi*, 12(2), 572–592.
- Bateman, C., & Nacke, L. E. (2010, May). The neurobiology of play. In *Proceedings of the International Academic Conference on the future of game design and technology* (pp. 1–8).
- Doebel, S., & Zelazo, P. D. (2015). A meta-analysis of the Dimensional Change Card Sort task: Implications for developmental theories and the measurement of executive function in children. *Developmental Review*, 38, 241–268.
- Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, 119(1), 182–191.
<https://doi.org/10.1542/peds.2006-2697>
- Gonçalves, A. C. (2024). The impacts of screen use on child development. *Arquivos de Neuro-Psiquiatria*, 82(S 02), A222.
- Hutton, J. S., Dudley, J., Horowitz-Kraus, T., DeWitt, T., & Holland, S. K. (2020). Associations between screen-based media use and brain white matter integrity in preschool-aged children. *JAMA Pediatrics*, 174(1), e193869.
<https://doi.org/10.1001/jamapediatrics.2019.3869>
- Hutton, J. S., Phelan, K., Horowitz-Kraus, T., Dudley, J., Altaye, M., DeWitt, T., & Holland, S. K. (2019). Story time turmoil: Child and parent factors associated with reading difficulties in preschool-aged children. *Academic Pediatrics*, 19(8), 832–843.
- Jean-Baptiste, C. (2021). Cyberbullying: The digital world of awareness and emerging concerns (Master's thesis, Long Island University, Brooklyn).
- Khouja, J. N., Munafò, M. R., Tilling, K., Wiles, N. J., Joinson, C., Etchells, P. J., ... & Nurius, P. S. (2023). Effects of excessive screen time on child development: An updated review and strategies for management. *Cureus*, 15(6), e40503.

- Mee, R. W. M., Harun, N. H., Pek, L. S., Mohamed, S., Shahdan, T. S. T., & Ahmad, A. (2024). The impact of screen time on children's well-being development: a scoping review. *International Journal of Public Health*, 13(3), 1192–1200.
- Moldenhauer, R. D. (2024). The interplay between screen time and outdoor play on preschool children's cognitive and social-emotional development.
- Newsweek News Article. (2023, November 17). Scientists reveal exactly how screen time affects children's brains. Retrieved from <https://www.newsweek.com/scientists-reveal-screen-time-children-brains-covid-1844669>
- Niu, Z., Zhao, Y., Qin, S., Wang, L., Cao, H., Liu, J., ... & Qiu, J. (2023). Negative impact of daily screen use on inhibitory control network in preadolescence: A two-year follow-up study. *Developmental Cognitive Neuroscience*, 60, 101218.
- Pant, P. (2025). Balancing Screen Time and Human Interaction in Blended Learning. In *Blending Human Intelligence With Technology in the Classroom* (pp. 119–156). IGI Global Scientific Publishing.
- Paulus, M. P., Squeglia, L. M., Bagot, K., Jacobus, J., Kuplicki, R., Breslin, F. J., ... & Bartsch, H. (2019). Screen media activity and brain structure in youth: Evidence for diverse structural correlation networks from the ABCD study. *NeuroImage*, 185, 140–153.
- Qi, J., Yan, Y., & Yin, H. (2023). Screen time among school-aged children of aged 6–14: a systematic review. *Global health research and policy*, 8(1), 12.
- Reid Chassiakos, Y. L., Radesky, J., Christakis, D., Moreno, M. A., Cross, C., Hill, D., ... & Swanson, W. S. (2016). Children and adolescents and digital media. *Pediatrics*, 138(5), e20162593.
- Shanmugasundaram, M., & Tamilarasu, A. (2023). The impact of digital technology, social media, and artificial intelligence on cognitive functions: a review. *Frontiers in Cognition*, 2, 1203077.
- Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. National Academy Press.

- Vedechkina, M., & Borgonovi, F. (2021). A review of evidence on the role of digital technology in shaping attention and cognitive control in children. *Frontiers in Psychology*, 12, 611155.
- Wasie, T. (2024). *Screen to green: Navigating the digital dilemma* (Vol. 1). Teshome Wasie. Morgan, E. (2024). *Balance Screen Time with Green Time: Connecting Students with Nature*. Corwin Press.
- Yogman, M., Garner, A., Hutchinson, J., Hirsh-Pasek, K., Golinkoff, R. M., Committee on Psychosocial Aspects of Child and Family Health, & Council on Communications and Media. (2018). The power of play: A pediatric role in enhancing development in young children. *Pediatrics*, 142(3), e20182058.
- Zosh, J. M., Gaudreau, C., Golinkoff, R. M., & Hirsh-Pasek, K. (2022). The power of playful learning in the early childhood setting. *YC Young Children*, 77(2), 6–13.

Is Digital Play Really Play? Prioritizing Offline Play in a Commercialized World

Rachel Franz, M.Ed.

Introduction

Child development experts agree that the best practices in supporting young children's development are infused with child-led play. When educators provide children with the time and space to play with rich, open-ended materials and opportunities to connect with peers and trusted adults, children thrive. As children play, responsive caregivers follow children's interests, scaffold their experiences, celebrate their unique identities, and cultivate culturally responsive environments. This type of play— indoors and outdoors— meets young children's social, biological, and cognitive needs and is a critical part of childhood (National Institute of Play, n.d.).

Yet, there is a growing, powerful narrative that young children *need* technology early and often to thrive in our increasingly digital world; some scholars even argue that using tablets must be included as part of preschoolers' daily routine in order for educators to be responsive and culturally relevant (Chu et al., 2024; Rogow, 2023). Families have bought in on the need for early technology use, and a majority believe that their children need technology to learn and develop successfully (Fairplay, 2025). Another survey found that parents of young children believe that their children learn better from educational apps than hands-on toys (Radesky et al., 2016). Schools and popular childcare standards require educators to engage children with digital devices (NAEYC, 2020). Some researchers have added “digital play” to the list of long-recognized, evidence-based play types (Chu et al., 2024).

Problem Statement

Granting ‘digital play’ equal weight to traditional, sensory-rich play is more than a miscategorization; it is a false equivalence that can jeopardize children's development and well-being by displacing meaningful offline experiences that they need to thrive and exposing them to harmful corporate-driven design practices.

This white paper argues that preschoolers' use of digital devices cannot replace (and likely works against) hands-on learning via play. It shows that “digital play” does not meet the criteria for meaningful, child-led play, and recommends ways educators can prioritize children’s offline play in early childhood settings.

Background

The term “digital play” was popularized around 2014 and generally refers to engagement with tablets for play and learning (Fleer, 2014). Proponents say it is a distinct category of play (Chu et al., 2024). In one literature review on digital play, researchers wrote, “Digital play [is] a category of play existing in its own right alongside well-known and traditionally accepted forms of play such as socio-dramatic play, rough and tumble play and locomotor play” (Chu et al., 2024).

The increased call for digital play in preschools has occurred simultaneously with the heightened academic pushdown, where developmentally inappropriate practices are imposed on children, younger and younger (Harmon & Viruru, 2018). Pressure to get children ready for kindergarten and the very powerful marketing machine of “Big Tech” have driven families to believe early childhood screen time is essential for learning (Fairplay, 2025). Adding to that narrative, most popular apps and platforms for young children are advertised as “educational” or “for learning,” even though scholars have found that “only a handful” of preschool apps are even remotely educational (Hirsh-Pasek, 2015; Meyer et al., 2021). Frequent false marketing is possible because no regulation currently defines the term “educational,” which allows companies to prey on families’ and educators’ desire to do what is best for the children in their care. The myth that young children need digital experiences earlier in order to ‘keep up’ with the world around them has been debunked numerous times, but the narrative persists (Cantor et al., 2025; Fairplay, 2025).

Research supporting “digital play” is limited. For example, a recent literature review of digital play-specific studies found that only 8% of published articles on the topic mentioned potential harms (Chu et al., 2024). Those 8% noted significant harms, including less physical activity, distraction, addiction, violence, decreased ability to self-regulate, vision problems, and decreased time socializing, yet the overall tone of digital

play scholarship has overwhelmingly promoted its benefits. Yet, “digital play” appears to be a niche term, and this research does not include the thousands of studies documenting substantial harm of excessive screen time on young children (see Muppalla et al., 2023). What’s more, digital play scholars have yet to acknowledge the intentional manipulative design strategies (or intentional designs embedded in digital apps and platforms that manipulate a user into taking action by spending more time/money on the platform) rampant in early childhood apps (Mallawaarachchi et al., 2023; Radesky et al., 2022). In addition, no studies show that children benefit more from digital play than offline play, except for children who use technology as an assistive device to support their participation in play.

Appropriate Approaches/Strategies

Using Definitions of Play to Guide the Way

Early childhood professionals have a responsibility to ensure that their practices are child-centered and developmentally supportive. The push for more digital play has confused early childhood practitioners who want to stay relevant to children’s interests while also supporting their well-being. To better understand why digital play can never replace traditional play, we can evaluate tablet-based activities, such as using an app targeted at preschoolers, by using best-practice definitions of play. For example, experts Dr. Marsha Nell and Dr. Walter Drew (2013) describe five essential components of meaningful play:

1. Children make their own decisions.
2. Children are immersed in the moment.
3. Children are intrinsically motivated.
4. Play is spontaneous (not scripted).
5. And play is enjoyable.

Below, I compare how each component is present (or not) in offline, hands-on play and in online, corporate-driven environments to support the call for less screen time in early childhood settings. Most high-quality educators treat the environment as the third teacher (Strong-Wilson et al., 2007). Early childhood providers diligently curate spaces that are safe, engaging, and enriching. Many adults assume that when children use

devices, they remain in the safe, supportive environment where their bodies are. But digital experiences can transport children into whole new environments, not neutral play spaces, that are designed by corporations whose interests rarely align with children's developmental needs. These are often likened to shopping malls or casinos (Kou et al., 2025). From a developmentally appropriate early childhood perspective, the offline environment must be treated as distinct from a developmentally appropriate early childhood environment.

1. Children make their own decisions.

When children engage in traditional, hands-on play offline, they generally drive what happens. Adults may be present to follow children's leads or supervise from afar, but the child controls the pacing, choices, and direction of play. Through this independence, children problem-solve, experiment, and ultimately learn. For example, when playing with a favorite doll, a child can decide who the doll is, what it wants, where it goes, and how the story starts and ends. Since the rules are created by the child, the child can change them or discard them all together at his or her discretion. Sometimes, children's choices are limited by access to materials or availability for an adult to supervise (such as to go outside), but appropriate, child-based choices are available regardless of the circumstances.

In digital environments, it may seem like children are making choices, ranging from the games they play, the clothes they choose for a game character, or what they click on. But, for the most part, the company behind the app orchestrates the direction, pace, and choices. These choices are usually dictated by algorithms (recommendations made by the company based on what they know about the child and/or how they can best get them to take a certain action) and other manipulative design strategies (intentional ways a game is designed to push users into doing something particular, like staying on longer or watching an ad) that are beyond the awareness of most adults let alone children (Yang & Leiser, 2022).

Children's choices and creativity are further restricted as their play is limited to the script of the game. Closed-ended options, such as having only one particular way to

go down a path, or a specific way to place a letter to get a reward, limit opportunities for imagination and problem solving.

2. Children become immersed in the moment.

When children are deep in traditional play, it's not unusual for adults or peers to have trouble getting their attention because they are immersed in the moment. Children may become frustrated or upset when play ends. But, because play happens at their pace and is driven by their decisions, this is not harmful. In fact, those reactions are linked to children's inability to self-regulate during early childhood, when making transitions in general are difficult (Munzer et al., 2021). Children's engagement in traditional play also flows with natural stopping points, like when they get hungry or tired or interested in something else entirely. Because play is sensory, most children are in tune with their bodies or surroundings (with adult prompting, of course).

In contrast, when children use digital devices like tablets, they engage at the mercy of the tech companies who design the device and apps. Since most tech companies' business models rely on monopolizing users' time and attention, it is most profitable for them to hook children so much so that they are mesmerized by or stuck to the game. Companies use manipulative design strategies called "engagement tactics" to intentionally extend the amount of time users spend on their game or platform. For example, popular early childhood app "ABCmouse™" deliberately makes it difficult for preschoolers to log out by giving them a prize when they try to sign out, thus, urging them to use the prize immediately instead of leaving the game. Some apps also trick children into clicking on ads or accessing outside content, much of which can be violent, sexual, or otherwise inappropriate (Radesky et al., 2020). Baiting children to click ads is common especially in free to play early childhood apps; around 93% of "educational" early childhood apps contain advertisements, but they cannot really distinguish them from their regular game play until they are much older (Hirsh-Pasek et al., 2015; Levine, 2023).

Other engagement tactics like autoplay on YouTube keep children scrolling from one video to the next, making it hard for children to disengage because there are no clear starting and stopping points. While offline play has natural stopping points, tech

companies intentionally obscure or remove places to take breaks or for children to listen to their bodies. Research shows that the more engagement tactics like these there are in an app, the more likely children are to have trouble disengaging (Mallawaarachchi et al., 2025).

3. Children are intrinsically motivated.

When children are intrinsically motivated by their own ideas, values, goals, and curiosities, they are more likely to engage in deep, meaningful play, leading to a love of learning and increased focus skills (Kohn, 1993). During meaningful offline play, children are rewarded when they find meaning in their experiences, discover something new, and make connections. This internal drive helps children to develop resilience. They persist when things get difficult because the goal is *theirs*. Additionally, they develop a strong sense of self and personal values as they pursue their own interests (Deci et al., 2001).

In contrast, most apps for young children center on extrinsic rewards. These are often in the form of prizes like gems or stars or celebratory noises (bells, whistles) that appear when a child does something correctly in a game. In most cases, the rewards are frequent and are given even for the most mundane action. Yet, each reward triggers the release of dopamine and too frequent triggering can lead to habit formation. For example, children will want a dopamine hit more often, leading them to keep returning to the game or having trouble disengaging in the game (Kumar & Manohar, 2025). In the real world, children do not get stickers, exaggerated praise, or fun whistles every time they stack a block or get buckled into a car seat. Constant rewards during digital experiences can condition, or “wire,” a child’s brain to expect rewards; this can work against children’s ability to work through hardship and create a reliance on rewards (Deci et al., 2001; Zicherman & Cunningham, 2011).

Some games take extrinsic motivation a step further by using gambling-like tactics called variable rewards. For example, in many apps, there are spinning wheels or treasure boxes filled with a very small potential to win big, and a large potential to win useless prizes. These can be even more addictive than frequent, expected rewards, especially for children who have not yet developed impulse control (Shultz, 2016).

4. Play is spontaneous (not scripted).

Similarly to supporting children in their decision-making, meaningful offline play offers opportunities for children to follow where their imagination or the world around them takes them. The direction of the play shifts based on children's curiosities, mistakes, new ideas, moods. Inside, a collapsed block tower can become a fence for some toy cows. Outside, hours of play can erupt on a windy day, or a trail of ants emerges on the sidewalk. Children are not constrained by a script and can adapt in the moment (Linn, 2009).

Online environments inevitably provide a script. They are closed-ended in ways where there is only one right path to take, letter to choose, or food to feed a virtual pet. Games and platforms rely on predefined (and often commercial) characters, worlds, objectives, and storylines that shape how play unfolds. Favorite characters come with established personalities, narratives, and rules that dictate what is possible within the app. Spontaneity is replaced with selection among pre-approved options, limiting opportunities for open-ended invention and genuine creative surprise.

5. Play is enjoyable.

There are certainly times that children can have fun while using a tablet. Laughter, excitement, and a sense of accomplishment can occur both on and off a device. In offline play, enjoyment typically arises from exploration, social connection, imagination, and a sense of agency. The intrinsic nature of the play means that the joy is derived from self-satisfaction.

In “digital play,” extrinsic-driven engagement means that sometimes this joy is engineered and more about what's provided by the app itself. As discussed earlier, the frequent and variable reward systems in popular apps can manufacture satisfaction (via dopamine). But that satisfaction is dependent on the reward system continuing to deliver stimulation. Children may appear happy while playing, yet feel irritable, empty, or dissatisfied once the experience ends, much like a sugar crash (Lembke, 2021). This doesn't support sustained well-being in the same way that hands-on, sensory-filled play does.

Divesting in Digital Play

The technological design of digital play which targets children is unfair to children, caregivers, and educators. The good news is that there are a number of steps for those who care about children that can be taken in order to disrupt the adoption of “digital play” in early childhood:

Cultivate Early Childhood Settings as “Play Sanctuaries.” Prioritizing multi-sensory, open-ended play is an act of resistance against all the systems that work against equitable, high-quality early childhood outcomes. Early childhood programs can ensure that children maintain their right to play by ensuring that play stays evidence-based and developmentally enriching (i.e., not digital). By serving as models, these programs can show families the deep engagement that happens for children as they play with mud, blocks, and fabrics, which can help to illustrate why offline play is irreplaceable. At the same time, tablet use must not be labeled as play. This prevents the “false equivalence” from taking root in curriculum standards.

Apply a “Play Lens” to Evaluation. Use Nell and Drew’s (2013) “5 Essential Components of Meaningful Play” as not only a vetting tool, but a way to empower educators to advocate for why they choose not to embed play with tablets into children’s daily experiences. If it doesn’t meet the criteria, keep it out of the classroom. Practitioners can also take it a step further by evaluating all technology in the program using the Screen Aware Early Childhood Framework (SAFEC), introduced in a 2025 publication of the same title (Cantor et al., 2025). Alongside these lenses, additional education for both professionals and families on the corporate business model is essential to understand all the ways that most apps are designed against play.

Resist Technology Requirements. It’s a common tale that early educators feel stuck because they are required to use technology in their early learning settings. Let’s be clear: Technology related to accessibility is never an option. But so often this requirement has not been fully considered— especially when it comes to the manipulative, corporate design of so many digital experiences marketed to preschoolers. If a school or district insists on using technology, we must be clear that children’s appropriate development takes precedence over all else.

Advocate for research-informed child-care policies. In the United States, state child-care regulations are highly variable and often developmentally inappropriate. Learn your relevant requirements and be prepared to go above and beyond. Some states don't require programs to have any policies about tech use, even for babies and toddlers. It's important to fight for regulations that put children's development ahead of corporate interests and trends, especially those that forbid screen time for children under 2 (and under 6 is even better).

Advocate for safety by design legislation. This would ensure that companies design technology with children's development at the forefront and would hold accountable those companies who do not. Join the movement led by organizations like [Fairplay](#), contact your legislators, and share your stories of success with offline, high-quality play.

Conclusion/Recommendation

While “digital play” continues to gain traction, we must recognize that digital platforms are not neutral tools; corporate environments put profit over kids. If we don't, we risk displacing the child-led, hands-on play that children need by exposing them to harmful manipulative design tactics and content. To protect children's well-being and right to play, we need to reject the false equivalence of digital play and reclaim early childhood settings as play sanctuaries to truly ensure that all children can thrive.

References

- Cantor, P., Holohan, M., & Rogers, J. (2025). *Screen-aware early childhood: A realistic approach to helping young children thrive in a digitally complex world*. Teachers College Press.
- Chu, C., Paatsch, L., Kervin, L., & Edwards, S. (2024). Digital play in the early years: A systematic review. *International Journal of Child-Computer Interaction*, 40, 100652.
- Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again.” *Review of Educational Research*, 71(1): 1–27. <http://www.jstor.org/stable/3516064>

- Fairplay. (2025). Hooked from birth: Promoting structural change and avoiding parental shame in the battle to reduce early childhood screen time.
<https://fairplayforkids.org/wp-content/uploads/2025/08/UPDATED-JULY-2025-Fairplay-Early-Childhood-Screen-Time-White-Paper-FINAL.pdf>
- Fleer, M. (2014). The demands and motives afforded through digital play in early childhood activity settings. *Learning, Culture and Social Interaction*, 3(3), 202-209.
- Harmon, F., & Viruru, R. (2018). Debunking the myth of the efficacy of “push-down academics”: How rigid, teacher-centered, academic early learning environments dis-empower young children. *Journal of Family Strengths*, 18(1), 11.
- Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in “educational” apps lessons from the science of learning. *Psychological Science in the Public Interest*, 16(1), 3–34.
<https://doi.org/10.1177/1529100615569721>
- Kohn, A. (1993). *Punished by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. Houghton Mifflin.
- Kou, Y., Hernandez, R. H., & Gui, X. (2025, April). “The System is Made to Inherently Push Child Gambling in my Opinion”: Child Safety, Monetization, and Moderation on Roblox. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (pp. 1-18).
- Kumar, S.J.N. & Manohar, N. (2025). Dopamine loops and player retention: A study on reinforcement in free-to-play games. *Journal of Communication and Management*, 4(spl), 56-61. DOI: 10.58966/JCM20254spl09
- Levine, S. (2023). Protecting kids from stealth advertising in digital media. *Federal Trade Commission*.
https://www.ftc.gov/system/files/ftc_gov/pdf/p214505kidsadvertisingstaffperspective092023.pdf

- Lembke, A. (2021). *Dopamine nation: Finding balance in the age of indulgence*. Dutton.
- Linn, S. (2009). *The case for make believe: Saving play in a commercialized world*. New Press.
- Mallawaarachchi, S. R., Tieppo, A., Hooley, M., & Horwood, S. (2023). Persuasive design-related motivators, ability factors and prompts in early childhood apps: A content analysis. *Computers in Human Behavior*, 139, 107492.
- Mallawaarachchi, S., Cliff, D. P., Neilsen-Hewett, C., White, S. L., Radesky, J., Horwood, S., & Howard, S. J. (2025). Effects of persuasive app design and self-regulation on young children's digital disengagement. *Human Behavior and Emerging Technologies*, 2025(1), 8187768.
- Meyer, M., Zosh, J. M., McLaren, C., Robb, M., McCaffery, H., Golinkoff, R. M., Hirsh-Pasek, K., & Radesky, J. (2021). How educational are “educational” apps for young children? App store content analysis using the Four Pillars of Learning framework. *Journal of Children and Media*, 15(4), 526-548.
- Munzer T. G., Miller A. L., Wang Y., Kaciroti N., & Radesky J. S. (2021) Tablets, toddlers and tantrums: The immediate effects of tablet device play, *Acta Paediatrica*, 110(1), 255–256. <https://doi.org/10.1111/apa.15509>, 32735726
- Muppalla, S. K., Vuppalapati, S., Pulliahgaru, A. R., & Sreenivasulu, H.. (2023). Effects of excessive screen time on child development: an updated review and strategies for management. *Cureus*, 15(6).
- NAEYC. (2020). Developmentally Appropriate Practice: A Position Statement of the National Association for the Education of Young Children. <https://www.naeyc.org/resources/position-statements/dap/contents>
- National Institute of Play (n.d.). Why we play. <https://nifplay.org/what-is-play/biological-drive-to-play/>
- Nell, M. L., & Drew, W. (2013). Five Essentials to Meaningful Play. NAEYC. <https://www.naeyc.org/our-work/families/five-essentials-meaningful-play>

- Radesky J. S., Eisenberg S., Kistin, C. J., Gross, J., Block, G., Zuckerman, B., & Silverstein, M. (2016). Overstimulated consumers or next-generation learners? Parent tensions about child mobile technology use. *Annals of Family Medicine*, 14(6), 503–508. 10.1370/afm.1976
- Radesky, J., Chassiakos, Y. L. R., Ameenuddin, N., Navsaria, D., & Council on Communication and Media (2020). Digital advertising to children. *Pediatrics*, 146(1), e20201681.
- Radesky, J., Hiniker, A., McLaren, C., Akgun, E., Schaller, A., Weeks, H. M. & Gearhardt, A. N. (2022). Prevalence and characteristics of manipulative design in mobile applications used by children. *JAMA Network Open*, 5(6), e2217641.
- Rogow, F. (2023). Framing. *YC Young Children*, 78(4), 6-14.
- Schultz, W. (2016). Reward prediction error. *Current Biology*, 27(10), R369-R371.
- Strong-Wilson, T., & Ellis, J. (2007). Children and place: Reggio Emilia's environment as third teacher. *Theory into practice*, 46(1), 40-47.
- Yang, W. T., & Leiser, M. (2022). Illuminating manipulative design: From "dark patterns" to information asymmetry and the repression of free choice under the unfair commercial practices directive. *Loyola Consumer Law Review*, 34, 484.
- Zichermann, G., & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps*. O'Reilly Media.

Screens, Play, and the Developing Brain: Restoring Balance in Modern Childhood

Celia Hogan, Nature Education Specialist

Introduction

Children's daily environments have changed dramatically over the past decade. Across many countries, children spend more time on digital devices and significantly less time in free, imaginative, outdoor play. While digital technology offers benefits, increasing evidence suggests that excessive screen exposure, particularly in early childhood, can affect sleep, attention, emotional regulation, and social development.

At the same time, opportunities for play, movement, and exploration have declined. Research from neuroscience, psychology, and education shows that these experiences are critical for healthy brain development. Through play, children develop executive function, resilience, creativity, empathy, and the ability to regulate emotions and manage risk.

This white paper examines current research on the developmental impacts of screen exposure and the role of play in supporting healthy brain development. Drawing on international studies and practical examples from play-based programs, it highlights the growing imbalance between digital engagement and real-world play experiences.

The paper concludes that restoring balance in modern childhood does not require eliminating technology, but ensuring that children continue to experience the types of play that support their development. Recommendations focus on protecting time for free play, expanding access to nature-based play, supporting healthy screen habits, strengthening relationships, and designing learning environments and communities that prioritize play-rich childhoods.

Childhood is changing at a pace no generation has experienced before. Over the past decade, screens have shifted from being an occasional part of children's lives to an everyday presence woven into home, school, and social environments. At the same time, opportunities for free, imaginative, active, and outdoor play have steadily declined

(Gray, 2011, 2013). Many children now spend more time sitting, watching, and swiping than exploring, creating, and connecting with others face-to-face (Rhodes et al., 2022).

From a New Zealand perspective, these trends mirror what is being observed internationally: Rising screen use across all ages, declining outdoor play, increased sedentary behavior, and growing concerns about children's well-being (Rhodes et al., 2022; Royal Children's Hospital National Child Health Poll, 2024). Neuroscience shows that these shifts matter. The developing brain relies on movement, rich sensory input, relationships, and unstructured play to build the neural pathways that support attention, emotional regulation, empathy, and resilience (Radesky & Christakis, 2023).

Research now links high screen exposure, particularly in early childhood, with challenges in sleep, attention, self-regulation, and social development (Domoff et al., 2020; Madigan et al., 2019; Radesky & Christakis, 2023). For older children and adolescents, heavy use of smartphones and social media is associated with increased anxiety, loneliness, and mood difficulties (Haidt & Rausch, 2026; Kelly et al., 2025; Twenge, 2020).

Alongside these concerns, a strong evidence base highlights the protective power of play. When children climb, imagine, negotiate, take risks, and explore natural or social environments, they strengthen the very skills and capacities that digital experiences often displace (Prins et al., 2022; Sandseter et al., 2021; Sandseter & Kleppe, 2024).

This paper explores what current research reveals about these contrasting developmental pathways and how families, educators, and communities can help restore balance in a digital age.

Problem Statement

Modern childhood is undergoing a profound shift. Across New Zealand and internationally, children spend more time on digital devices than ever before and significantly less time in free, imaginative, and active play (Rhodes et al., 2022; Royal Children's Hospital National Child Health Poll, 2024). This change is not simply a

lifestyle preference; it is reshaping key developmental experiences that children's brains depend on (Radesky & Christakis, 2023).

A growing body of research shows that high levels of screen exposure, especially when introduced early, compete with the kinds of interactions that build foundational neural pathways (Domoff et al., 2020; Radesky & Christakis, 2023). Screen use displaces relational moments, reduces language-rich exchanges, and limits opportunities for movement, sensory exploration, and problem-solving (Domoff et al., 2020). Studies in the early years link high screen time with delays in communication, reduced attention, difficulties in emotional regulation, and disrupted sleep, core developmental capacities that typically emerge through play, social connection, and caregiver interaction (Madigan et al., 2019; Radesky & Christakis, 2023).

At the same time, many children have fewer opportunities for outdoor, social, or unstructured play (Gray, 2011; Louv, 2008). Families report time pressures, safety concerns, and increasingly device-centered routines (Haidt, 2024; Twenge, 2017). Schools, too, are navigating increased digital integration, often resulting in more sedentary learning and fewer extended periods of self-directed play or outdoor exploration (Rhodes et al., 2022). Together, these factors mean many children spend most of their day in environments that are passive, screen-based, and cognitively overstimulating, yet physically under-stimulating (Radesky & Christakis, 2023).

For older children and adolescents, the issues compound. The rise of smartphones and social media has introduced constant connectivity, comparison, and performance pressure (Twenge, 2020). A growing number of longitudinal studies link heavy social media use with increased symptoms of anxiety and depression, particularly among girls (Kelly et al., 2025; Twenge, 2020). Sleep disruption, driven by evening screen use and nighttime device access, is now widespread, and poor sleep further affects mood, attention, and self-regulation (Royal Children's Hospital National Child Health Poll, 2024).

These challenges do not arise simply because screens exist, but because they are now replacing essential developmental experiences. Play, especially physical, social, imaginative, and nature-based play, is one of the primary ways children develop

executive function, resilience, creativity, empathy, and the capacity to manage risk (Prins et al., 2022; Sandseter et al., 2021). When play diminishes, children's opportunities to practice these skills diminish.

The issue, therefore, is not screens alone, but an imbalance: A modern childhood weighted heavily toward digital engagement and away from the types of play that support healthy brain development. Addressing this imbalance is central to supporting children's well-being in a digital age (Radesky & Christakis, 2023).

Background

Neuroscience over the past several decades has established a clear principle: Children's brains develop through experience (Radesky & Christakis, 2023). The wiring of neural pathways responsible for attention, emotional regulation, executive function, empathy, creativity, and resilience is shaped by the environments in which children spend the most time (Radesky & Christakis, 2023). Play, especially when it is active, social, imaginative, and grounded in the physical world, provides many experiences that support strong, flexible brain development (Prins et al., 2022; Sandseter & Kleppe, 2024).

The Neuroscience of Play

Play offers repeated opportunities for children to practice decision-making, problem-solving, risk assessment, collaboration, and emotional regulation (Sandseter et al., 2021). Through movement, sensory exploration, and social negotiation, children build the neural networks that enable executive functioning and self-control (Domoff et al., 2020). Research in developmental neuroscience and psychology shows that unstructured play strengthens pathways in the prefrontal cortex and supports the development of working memory, cognitive flexibility, and inhibitory control, skills essential for learning and well-being (Radesky & Christakis, 2023; Sandseter & Kleppe, 2024).

Active, imaginative, and nature-based play also exposes children to rich sensory input. These varied experiences help integrate different brain regions, supporting more

adaptive responses to stress and challenges (Prins et al., 2022). Play with peers helps develop empathy, cooperation, and social reasoning (Sandseter et al., 2021).

Changes in Children's Environments

Over the past decade, children's environments have shifted dramatically. Digital devices have become embedded in daily routines across homes, schools, and early learning settings (Rhodes et al., 2022). As screen access has increased, opportunities for free play, exploration, and outdoor activity have declined (Haidt, 2024; Twenge, 2020).

These shifts matter because screen time often replaces the experiences play naturally provides (Domoff et al., 2020). Screens tend to offer fast-paced, highly stimulating input that requires little motor movement, minimal problem-solving, and limited social reciprocity (Radesky & Christakis, 2023). In contrast, traditional play supports slower, deeper, more varied engagement that helps children practice self-regulation and sustained attention (Prins et al., 2022).

Research on Screen Exposure

A growing body of peer-reviewed research highlights the developmental impacts of chronic or early screen exposure (Radesky & Christakis, 2023). Studies in infants and preschoolers link high screen use with reduced parent–child interaction, delayed communication skills, disrupted sleep patterns, and lower scores on developmental assessments (Madigan et al., 2019; Suryavanshi et al., 2024). For primary-aged children, increased recreational screen time is associated with difficulties in attention, emotional regulation, and executive functioning (Domoff et al., 2020).

Among adolescents, longitudinal studies increasingly show associations between heavy social media use and declines in well-being, increases in anxiety and depression, and challenges with sleep quality (Kelly et al., 2025; Twenge, 2020). These findings are consistent across multiple countries, suggesting that the effects are not specific to one culture or education system but reflect broader changes in childhood environments (Haidt & Rausch, 2026).

The Role of Nature and Outdoor Play

At the same time, research on nature-based and outdoor play highlights significant benefits. Exposure to natural environments has been shown to improve attention, reduce stress, and support emotional regulation (Ernst, 2024; Prins et al., 2022). Outdoor play encourages risk-taking, physical competence, creativity, and collaboration (Sandseter et al., 2021; Sandseter & Kleppe, 2024). Studies demonstrate that children who regularly spend time in nature show improvements in executive function and overall well-being (Ernst, 2024; McDonnell et al., 2024).

A Developing Imbalance

Taken together, this research suggests that many children’s daily experiences are becoming imbalanced: More digital stimulation, less real-world exploration; more passive consumption, less active play; more connection through screens, but less face-to-face social practice (Radesky & Christakis, 2023). Understanding this imbalance is key to identifying approaches that restore healthy developmental conditions in a digital age.

Appropriate Approaches/Strategies

Addressing the imbalance between rising screen use and declining play does not require eliminating technology or idealizing a past version of childhood. Instead, the focus is on restoring the conditions that support healthy brain development: Movement, connection, imagination, nature, and opportunities for children to practice self-regulation in real-world settings (Radesky & Christakis, 2023; Prins et al., 2022).

Evidence across developmental science, psychology, education, and public health points to several strategies that help children thrive in a digital age (Haidt, 2024; Radesky & Christakis, 2023).

Protecting and Prioritizing Free, Unstructured Play

Free play—where children choose their activity, pace, and style of engagement—offers developmental experiences that structured activities and digital environments often do not (Prins et al., 2022; Sandseter et al., 2021). Research consistently shows that

unstructured play strengthens executive function, creativity, problem-solving, risk assessment, and social competence (Sandseter & Kleppe, 2024).

Increasing Access to Nature-Based Play

Nature-based play is a high-impact, low-cost strategy with strong evidence behind it (Prins et al., 2022). Studies show that time in natural environments supports attention, reduces stress, improves emotional regulation, and enhances physical and social development (Ernst, 2024; McDonnell et al., 2024). Nature also encourages play that is more imaginative, physically challenging, and cooperative (Sandseter et al., 2021).

Supporting Healthy Screen Habits

Screen use is now woven into modern life, and research suggests that the quality, timing, and context of screen use often matter more than rigid limits (Radesky & Christakis, 2023). Healthy screen habits help children develop digital literacy while protecting time for play, sleep, and social interaction (Domoff et al., 2020).

Strengthening Relationships and Connection

Strong relationships can buffer many developmental challenges associated with high screen use (e.g., reduced attention, emotional dysregulation, and loneliness) (Warburton et al., 2022). Play, especially social play, is a powerful way to build these connections (Sandseter et al., 2021).

Designing Learning Environments that Embed Play

Across early childhood and primary education systems internationally, there is growing recognition that play supports not only well-being but also learning outcomes (Prins et al., 2022; Sandseter & Kleppe, 2024). Schools can restore balance by integrating play-based and exploratory learning approaches throughout the day (Gray, 2013; Prins et al., 2022).

Engaging Communities to Support Play-Rich Childhoods

Communities play a critical role in shaping children's environments (Louv, 2008; Prins et al., 2022). When neighborhoods, councils, and organizations prioritize access to

nature, outdoor play spaces, and family-friendly policies, children benefit (Prins et al., 2022).

Encouraging Small, Sustainable Shifts

Families and educators are often under pressure, and overhauling routines can feel overwhelming. Research suggests that small, consistent shifts in behavior and environment can produce meaningful developmental change over time (Domoff et al., 2020; Radesky & Christakis, 2023).

Conclusion/Recommendations

Children's developmental environments have changed rapidly, and the rise of digital technologies has outpaced our understanding of their impact on young minds (Radesky & Christakis, 2023). At the same time, opportunities for free, active, imaginative play have declined worldwide (Gray, 2011; Haidt, 2024). Research across neuroscience, psychology, education, and public health shows that this shift is not neutral: Chronic screen exposure and reduced play affect attention, self-regulation, emotional well-being, and the development of core skills children rely on throughout life (Domoff et al., 2020; Madigan et al., 2019; Twenge, 2020).

Yet the evidence also points to a clear path forward. Play, particularly unstructured, social, and nature-based play, offers powerful protective benefits (Prins et al., 2022; Sandseter et al., 2021). It supports healthy brain development, fosters resilience, and builds the cognitive and emotional skills that help children thrive in an increasingly complex world (Ernst, 2024; McDonnell et al., 2024).

When families, educators, and communities create environments that prioritize play and balance digital engagement intentionally, children experience measurable improvements in well-being and development (Warburton et al., 2022).

By restoring play to the center of childhood and guiding screen use with intention, we can help children grow up with the capacities, confidence, and connection they need to flourish.

References

- Domoff, S. E., Harrison, K., Gearhardt, A. N., Lumeng, J. C., & Miller, A. L. (2020). Developmental pathways from early screen use to later self-regulation difficulties. *Child Development Perspectives*, 14(3), 123–130.
<https://doi.org/10.1111/cdep.12387>
- Ernst, J. (2024). Nature-based practices and self-regulation in preschoolers. *Journal of Environmental Education*, 55(2), 150–167.
- Gray, P. (2011). The decline of play and the rise of psychopathology in children and adolescents. *American Journal of Play*, 3(4), 443–463.
- Gray, P. (2013). *Free to learn: Why unleashing the instinct to play will make our children happier, more self-reliant, and better students for life*. Basic Books.
- Haidt, J. (2024). *The anxious generation: How the great rewiring of childhood is causing an epidemic of mental illness*. Penguin Press.
- Haidt, J., & Rausch, T. (2026). *Social media is harming adolescents at a scale large enough to cause changes at the population level*. World Happiness Report.
<https://www.worldhappiness.report/ed/2026/social-media-is-harming-adolescents-at-a-scale-large-enough-to-cause-changes-at-the-population-level/>
- Kelly, Y., Zilanawala, A., Booker, C., & Sacker, A. (2025). Social media use and depressive symptoms among early adolescents: A longitudinal study. *JAMA Network Open*, 8(2).
- Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*. Algonquin Books.
- Madigan, S., Browne, D., Racine, N., Mori, C., & Tough, S. (2019). Association between screen time and children’s performance on a developmental screening test. *JAMA Pediatrics*, 173(3), 244–250. <https://doi.org/10.1001/jamapediatrics.2018.5056>
- McDonnell, A. S., Brooker, R. J., & Stevenson, J. L. (2024). Nature walks enhance neural indices of executive control in children. *Developmental Cognitive Neuroscience*, 61, 101354. <https://doi.org/10.1016/j.dcn.2024.101354>

- Prins, R. G., van Deursen, J. A., McGill, E., & Holding, A. (2022). Nature play improves physical, social, and cognitive outcomes in early childhood: A systematic review. *PLOS ONE*, 17(5), e0267922.
- Radesky, J. S., & Christakis, D. A. (2023). Early childhood screen exposure and the developing brain. *Nature Reviews Psychology*, 2(8), 441–455.
- Rhodes, A., Clancy, E. M., & Nicholson, J. M. (2022). Child health and wellbeing during COVID-19: Changes in physical activity, screen time, and health-related quality of life. *BMC Pediatrics*, 22, 417.
- Royal Children’s Hospital National Child Health Poll (2024). *Sleep and screen use among Australian school-aged children*. Royal Children’s Hospital Melbourne.
- Sandseter, E. B. H., Kleppe, R., & Sando, O. J. (2021). Relations between children’s risky play and wellbeing and physical activity in early childhood education and care. *Early Child Development and Care*, 191(7–8), 1154–1165.
<https://doi.org/10.1080/03004430.2019.1653551>
- Sandseter, E. B. H., & Kleppe, R. (2024). Outdoor risky play. In *Encyclopedia of Child and Adolescent Health*. Elsevier.
- Suryavanshi, M. V., Falck, A., Beattie, E., & Mason, W. A. (2024). Infant screen exposure and autistic-like symptoms at age 2 years. *JAMA Pediatrics*, 178(11), e243992.
- Twenge, J. M. (2017). *iGen: Why today’s super-connected kids are growing up less rebellious, more tolerant, less happy—and completely unprepared for adulthood*. Atria Books.
- Twenge, J. M. (2020). Increases in depression, self-harm, and suicide among U.S. adolescents after 2010 and links to new media screen time. *Psychiatric Research & Clinical Practice*, 2(1), 19–33. <https://doi.org/10.1176/appi.prcp.20190015>
- Warburton, W. A., Kneebone, T., Lum, J. A. G., & South, C. (2022). Risk and resilience factors associated with Internet gaming disorder in adolescents. *Psychiatry Research*, 309, 114392. <https://doi.org/10.1016/j.psychres.2022.114392>

Playful Parents in Technoference Times

Miriam McCaleb, PhD

Introduction

It is a sad reality that not everyone understands the value of play as a conduit for learning and well-being (Bipath et al., 2022). As an advocate for children, an early childhood teacher, and a child development researcher, I have always found it necessary to help some parents understand what children's play means.

This might include explaining, in developmental terms, the value of children's play. Sadly, in this outcome-focused, hyper-busy, maximization-obsessed time in which we live (Paine, 2023), there is apparently more need than ever to justify play. It seems necessary not only to explain the benefits of play but also to clarify its definition as spontaneous, hands-on, and child-led.

Those who work with children and families must learn to communicate how a child's development is fostered when they build a fort, the skills a child develops when they build with blocks or model with clay, and how creative play prepares the brain for adulthood.

Having worked in this realm for more than 30 years, I find nothing new in this need to promote child literacy – that is, to support adults in becoming more literate and knowledgeable about children and explaining the "why" of play. Unfortunately, what is new is how many people seem to need support with the "how" of play.

Given the vital role of play in encouraging responsiveness and fostering warm, reciprocal connections between children and adults (Silton et al., 2026), supporting parents in recognizing the role serve-and-return interactions play in fostering healthy neurobiological growth is essential. Such serve-and-return interactions are exemplified in playful exchanges between the youngest babies and their loving families (Komanchuk, Letourneau, et al., 2023).

Into this already compromised play landscape comes a new threat: the Great Distractor. Nowadays, the use of smartphones is ubiquitous (Morris et al., 2022):

distracting parents and displacing playtime (Hiniker et al., 2015; Lemish et al., 2020), and the downsides are mounting.

Problem Statement

Researchers have a variety of words and concepts to describe what the influx of digital technologies means for our day-to-day lives, our families, and our relationships. The term used here is *technoference*: coined by McDaniel (2015), it describes technology's interference in our interpersonal relationships.

While the phenomenon was first named as an issue within romantic partnerships, it has since been the subject of ongoing study in families (Komanchuk, Toews, et al., 2023). Parental distraction by technologies such as smartphones results in technoference within the parent-child relationship. Researchers have found this to create challenges for children's language development (Corkin et al., 2021), behavior (McDaniel & Radesky, 2018), and – by reducing parental sensitivity - the formation of secure attachments (Braune-Krickau et al., 2021). The absence of a secure attachment being formed early in a child's life has been associated with acute and multifaceted impacts—raising risks for emotional dysregulation, chronic illnesses, and substance use disorders, while reducing resilience (Fairbairn et al., 2018). Early relationships matter, and technoference is a modifiable risk factor (Toledo-Vargas et al., 2025).

This is not a criticism of parents, as the powerful pull of these distractions is intentional by design (Fogg, 2009). Distracted parents are largely at the mercy of broader systems that enable the current extractive attention economy, in which people and families are the product (Birch et al., 2021). Nothing happens in a vacuum, and today's prolific technoference must be understood to be intertwined with other fiscal, social, and domestic realities. Many of today's families are under huge economic pressure; we are living through a time of rapid change – geopolitically as well as technologically- and seemingly everyone leads such busy lives. Modern parenthood is stressful for many (Wiltshire et al., 2021), and it can be hard to feel playful for many reasons. To those day-to-day stressors, add technoference and a side order of undervaluing play. Mix that with a lack of how-to knowledge, and it becomes clear that many families could use some help being playful (Kumar et al., 2022).

Approaches/Strategies

The Children's Screen Time Action Network (2026) is a not-for-profit organization that works to promote a healthy childhood by reducing the time kids spend on digital devices. They have a three-part plan for working with families, which I will refer to and expand on here, using our play promotion lens.

1. We must lead with the positive.

Wearing my health researcher hat, I understand this in terms of the value of promoting 'do more' health behaviors, rather than 'do less' health behaviors (Nemec et al., 2015). What do we want to encourage more of? The answer is, of course, more hands-on, hearts-on play (Ahmed et al., 2023).

This is the fun part. Instead of scolding parents about putting down their devices, we get to remind them about the joys of active play. Whether it is a backyard obstacle course or some spontaneous parkour on the walk home from the bus, moving our bodies is so good for us – at any age.

Similarly, we can enjoy flexing our brains by making up stories about experiences or daily events, or even have fun with our vocabulary choices. Some people might enjoy providing commentary for a pet's activities. We could all enjoy sharing books with the children in our lives (Krcmar & Cingel, 2014) - and doing all the silly voices is a vital part of the process!

Sure, some types of electronic play are less corrosive than others, and we can find studies pointing to the benefits of collaborative video game play (Alanko, 2023). However, it cannot be denied that these rob people of time outdoors and sleep (Hökby et al., 2025), both of which are recognized as indicators of a range of health and wellbeing outcomes (Oswald et al., 2020). There is no downside to purposeful digital hygiene habits, and In Real Life (IRL) play is a joyful part of that prescription.

From the start, learning how to connect with an infant and what baby play looks like will help new parents build those essential 'serve and return' relationships from day one. In terms of attachment relationships and neurobiology, this will benefit the next generation immeasurably throughout their lifespan.

2. Acknowledge challenge in an attempt to avoid shame.

This is vital. After all: "It is unreasonable to design services to be compulsive, and then reprimand [people] for being preoccupied with their devices." (Kidron et al., 2018, p. 5).

Our concern for children affected by technoferece in childhood must not be expressed as frustration with parents. The villains in this story are the architects of the attention economy (Wu, 2017), the 'attachment economy' as represented by AI (Center for Humane Technology, 2026), and perhaps the legislators whose regulations cannot keep track of the rapid pace of technological change. It does not help if those legislators also continue to take advice from lobbyists whose business models have every interest in distracting us (Popiel, 2018) – whether or not children are in the room.

We must tread with tenderness and compassion in acknowledging the way adult smartphone use has been normalized – even encouraged – despite the negative implications for the children in our care (McCaleb, 2021). Today's parents deserve understanding and empathy in this situation, which is the 'David v. Goliath' of modern parenting. Families are challenged to create the conditions for optimal child development, even as powerful corporate distraction machines work in opposition.

As Atli et al. (2019) write: "it is not enough for parents to just have certain parenting skills. They are supposed to adapt themselves to recent technological developments in the world" (p. 197). To feel truly playful and free, parents need support in this area. In my experience, parents describe a melange of uncomfortable feelings when they learn about the negative implications of technoferece for their children's development, and the lack of constraints on those who are distracting. In my work with families, as we stare down the uncomfortable research findings documenting harms associated with the overuse of digital technologies (Cullen et al., 2024), I hear stories of guilt, anger, and despair, none of which are natural bedfellows for a joyfully playful parent. Name and acknowledge the asymmetry in our relationships with technology so we can treat ourselves (and other parents) with kindness as we put down our devices and pick up our books, blocks, and balls.

3. Focus on structural change.

If this feels like a huge undertaking, it is because it is! This is where we use our play-passion to consider the depth and breadth of advocacy that supports parents in living more playfully.

Structural change might look like: continued **advocacy for tighter legislation** to curb Big Tech's overreach into our lives. For example, technology designers could create affordances that respond to whether there are kids in the room (Radesky & Hiniker, 2022).

It is worth **questioning the use of devices in schools and early childhood services**. The rapid uptick in ed-tech has critics (Ben-Jacob & Glazerman, 2021; Clement & Miles, 2017). Curious questions from engaged families may help teachers assess whether their moment-by-moment use of devices is necessary or an example of technochauvinism (Broussard, 2019)—that is, the belief that a technological solution is superior to a human one. Is this screen really required, or would a pen-and-paper solution be as relevant? While engaging with schools and early childhood services, we must use our voices to **support teachers as they promote playtime**, a.k.a recess (Kahn & Atkinson, 2025).

Supporting communities in accessing greater opportunities for play in **green spaces and safe public places**, for example, playgrounds (Heerman et al., 2017).

Working with local government to **create safer streets**. 'Child-friendly' cities are those where humans are prioritized over vehicles, and play is not an afterthought (Pia & Bezboruah, 2025).

Meanwhile, we can try to honor personal agency, even amid the cultural soups we all swim in. Technology use is a modifiable factor (Toledo-Vargas et al., 2025), so **keep switching off** where and when you can.

Conclusion

sTechnoference risks an optimal parent-child connection and distracts from IRL. By supporting parents and demanding safer digital and physical environments, we can - and must - promote the vital role of play, with life-enhancing benefits for the next generation.

References

- Ahmed, S., Khan, D. S., & Mehmood, A. S. (2023). Let them play: A systematic review investigating the benefits of free play in emotional development of children. *Academy of Education & Social Sciences Review*, 3(4), 509–520. <https://doi.org/10.48112/aessr.v3i4.660>
- Alanko, D. (2023). The health effects of video games in children and adolescents. *Pediatrics in Review*, 44(1), 23–32. <https://doi.org/10.1542/pir.2022-005666>
- Atli, S., Gunuc, S., Kuss, D., & Baran, G. (2019). Impact of parents' technology use on 18-to 24-month-old infants' adaptive behaviors. *Adaptive Behavior*, 27(3), 197–219. <https://doi.org/10.1177/1059712319845340>
- Ben-Jacob, M. G., & Glazerman, A. H. (2021). The ethical implications of excessive technology use in education. *Journal of Educational Technology Systems*, 50(1), 5–8. <https://doi.org/10.1177/00472395211013049>
- Bipath, K., Muthivhi, A. E., & Bhoola, S. (2022). Parents' understandings and practices regarding play and learning. *European Early Childhood Education Research Journal*, 30(4), 515–528. <https://doi.org/10.1080/1350293X.2022.2070648>
- Birch, K., Cochrane, D., & Ward, C. (2021). Data as asset? The measurement, governance, and valuation of digital personal data by Big Tech. *Big Data & Society*, 8(1), 7–16.
- Braune-Krickau, K., Schneebeli, L., Pehlke-Milde, J., Gemperle, M., Koch, R., & von Wyl, A. (2021). Smartphones in the nursery: Parental smartphone use and parental sensitivity and responsiveness within parent-child interaction in early

- childhood (0–5 years): A scoping review. *Infant Mental Health Journal*, 42(2), 161–175. <https://doi.org/10.1002/imhj.21908>
- Broussard, M. (2019). *Artificial unintelligence: How computers misunderstand the world*. MIT Press.
- Center for Humane Technology. (2026). Your Undivided Attention: *Attachment hacking and the rise of AI psychosis*.
- Clement, J., & Miles, M. (2017). *Screen schooled: Two veteran teachers expose how technology overuse is making our kids dumber*. Chicago Review Press.
- Corkin, M. T., Henderson, A. M., Peterson, E. R., Kennedy-Costantini, S., Sharplin, H. S., & Morrison, S. (2021). Associations between technoference, quality of parent-infant interactions, and infants' vocabulary development. *Infant Behavior and Development*, 64, 101611. <https://doi.org/10.1016/j.infbeh.2021.101611>
- Cullen, J., Muntz, A., Marsh, S., Simmonds, L., Mayes, J., O'Neill, K., & Duncan, S. (2024). Impact of digital screen use on health and wellbeing of children and adolescents: A narrative review. *New Zealand Journal of Physiotherapy*, 52(1), 62–77. <https://nzjp.otago.ac.nz/nzjp/article/view/364>
- Fairbairn, C. E., Briley, D. A., Kang, D., Fraley, R. C., Hankin, B. L., & Ariss, T. (2018). A meta-analysis of longitudinal associations between substance use and interpersonal attachment security. *Psychological Bulletin*, 144(5), 532–555. <https://doi.org/10.1037/bul0000141>
- Fogg, B. J. (2009). A behavior model for persuasive design. Proceedings of the 4th International Conference on Persuasive Technology, Claremont, CA.
- Heerman, W. J., Taylor, J. L., Wallston, K. A., & Barkin, S. L. (2017). Parenting self-efficacy, parent depression, and healthy childhood behaviors in a low-income minority population: A cross-sectional analysis. *Maternal and Child Health Journal*, 21(5), 1156–1165. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5392125/pdf/nihms843700.pdf>

- Hiniker, A., Sobel, K., Suh, H., Sung, Y.-C., Lee, C. P., & Kientz, J. A. (2015). Texting while parenting: How adults use mobile phones while caring for children at the playground. Proceedings of the 33rd annual ACM conference on human factors in computing systems, Seoul, South Korea.
- Hökby, S., Alvarsson, J., Westerlund, J., Carli, V., & Hadlaczky, G. (2025). Adolescents' screen time displaces multiple sleep pathways and elevates depressive symptoms over twelve months. *PLOS Global Public Health*, 5(4), e0004262.
<https://doi.org/10.1371/journal.pgph.0004262>
- Kahn, M., & Atkinson, C. (2025). Teachers' views about school playtime: A systematic literature review. *International Journal of Playwork Practice*, 5(1).
<https://doi.org/10.25035/ijpp.05.01.14>
- Kidron, B., Evans, A., & Afia, J. (2018). *Disrupted childhood: The cost of persuasive design*. <https://5rightsfoundation.com/uploads/Disrupted-Childhood-2023-v2.pdf>
- Komanchuk, J., Letourneau, N., Duffett-Leger, L., & Cameron, J. L. (2023). History of "Serve and Return" and a synthesis of the literature on its impacts on children's health and development. *Issues in Mental Health Nursing*, 44(5), 1–12.
<https://doi.org/10.1080/01612840.2023.2192794>
- Komanchuk, J., Toews, A., Marshall, S., Mackay, L. J., Hayden, K. A., Cameron, J. L., Duffett-Leger, L., & Letourneau, N. (2023). Impacts of parental technofence on parent-child relationships and child health and developmental outcomes: A scoping review. *Cyberpsychology Behavior and Social Networking*, 26(8), 579–603. <https://doi.org/10.1089/cyber.2022.0278>
- Krcmar, M., & Cingel, D. P. (2014). Parent–child joint reading in traditional and electronic formats. *Media Psychology*, 17(3), 262–281.
<https://doi.org/10.1080/15213269.2013.840243>
- Kumar, P. A., Syama, S., Srinivasan, S., Thomas, S., & Jose, K. A. (2022). Play and play spaces for global health, happiness, and well-being. In *Handbook of health and*

- well-being: Challenges, strategies and future trends* (pp. 129–154). Springer.
https://doi.org/10.1007/978-981-16-8263-6_6
- Lemish, D., Elias, N., & Floegel, D. (2020). "Look at me!" Parental use of mobile phones at the playground. *Mobile Media & Communication*, 8(2), 170–187.
<https://doi.org/10.1177/2050157919846916>
- McCaleb, M. (2021). Use it wisely. *OHbaby!*, (53), 74–77.
<https://www.ohbaby.co.nz/parenting/for-you-mama/smartphone-use>
- McDaniel, B. (2015). "Technoference": Everyday intrusions and interruptions of technology in couple and family relationships. In C. Bruess (Ed.), *Family Communication in the Age of Digital and Social Media*. Peter Lang.
<https://doi.org/10.1037/ppm0000065>
- Morris, A. J., Filippetti, M. L., & Rigato, S. (2022). The impact of parents' smartphone use on language development in young children. *Child Development Perspectives*, 16(2), 103–109. <https://doi.org/10.1111/cdep.12449>
- Nemec, P. B., Swarbrick, M. A., & Merlo, D. M. (2015). The force of habit: Creating and sustaining a wellness lifestyle. *Journal of Psychosocial Nursing & Mental Health Services*, 53(9), 24.
- Oswald, T. K., Rumbold, A. R., Kedzior, S. G. E., & Moore, V. M. (2020). Psychological impacts of "screen time" and "green time" for children and adolescents: A systematic scoping review. *PLoS One*, 15(9), e0237725.
<https://doi.org/10.1371/journal.pone.0237725>
- Paine, C. (2023). *The time-saving Mom: How to juggle a lot, enjoy your life, and accomplish what matters most*. Bethany House Publishers.
- Pia, N. A., & Bezboruah, K. (2025). Urban design strategies for creating child-friendly neighborhoods: A systematic literature review. *Cities*, 162, 105919.
- Popiel, P. (2018). The tech lobby: Tracing the contours of new media elite lobbying power. *Communication Culture & Critique*, 11(4), 566–585.

- Radesky, J., & Hiniker, A. (2022). From moral panic to systemic change: Making child-centered design the default. *International Journal of Child-Computer Interaction*, 31, 100351.
- Screen Time Action Network. (2026). *Collaborating to support children and families in a digital world*. <https://screentimenetwork.org/>
- Silton, N. R., Chavez, K., & Candalario, M. (2026). The game of life: The richness of play in formulating healthy attachments. In N. R. Stilton (Ed.), *Benefits of play, play therapy, sports, and recreation for children of diverse backgrounds* (pp. 1–30). IGI Global Scientific Publishing <https://doi.org/10.4018/979-8-3373-2675-7.ch001>
- Toledo-Vargas, M., Chong, K. H., Maddren, C. I., Howard, S. J., Wakefield, B., & Okely, A. D. (2025). Parental technology use in a child's presence and health and development in the early years: A systematic review and meta-analysis. *JAMA Pediatrics*. <https://doi.org/10.1001/jamapediatrics.2025.0682>
- Wiltshire, C. A., Troller-Renfree, S. V., Giebler, M. A., & Noble, K. G. (2021). Associations among average parental educational attainment, maternal stress, and infant screen exposure at 6 months of age. *Infant Behavior and Development*, 65, 101644. <https://doi.org/10.1016/j.infbeh.2021.101644>
- Wu, T. (2017). *The attention merchants: The epic scramble to get inside our heads*. Vintage.

Let's Grow Brain P.O.W.E.R.! What Kids REALLY Need to Thrive and How Screens Interfere

Katie Talarico, MEd

Introduction

Parenting in the digital age is difficult. Maintaining consistent rules is exhausting, and screen time battles feel inevitable. Devices are hard for families to manage. The truth is that parents today are tasked with an impossible feat: to MANAGE the UNMANAGEABLE. Most screen-based activities for children (and adults) have been purposefully designed to be unmanageable: to capture and hold their attention hostage, and to override their best intentions.

These purposeful design features, in combination with well-financed marketing departments, have steered screens into a role of perceived necessity and inevitability in childhood - without proof of benefit. At the same time, an ever-growing body of independent research shows significant harms to the health and well-being of children who overuse screens. Parents are inundated with conflicting messages.

Many advocates are working tirelessly for change through legislation and policies that protect children online, push companies to create safer products for children, and hold companies accountable for harms they cause. However, this is a slow process, and parents are still on the front line, protecting and guiding their children through the digital world. Families need solutions!

On the bright side, research also shows extraordinary benefits to children's development from simple and time-honored activities like play, outdoor time, chores, engaging with others, and reading. We must push back on the assumption that screen time is necessary and inevitable for learning and growth, and strive to bring healthy development back to the center of childhood.

Let's Grow Brain P.O.W.E.R.! aims to do both. Research shows that parents are more receptive to positively framed messages about screen time than to negatively framed, or fear-based, messages (Fairplay, 2025). The Let's Grow Brain P.O.W.E.R.! framework shifts the focus to healthy development, or in other words, what children

really need to grow and thrive. P.O.W.E.R. is an acronym that highlights healthy developmental activities that provide children opportunities to build the *human skills* they will need in the future.

P- Play

O- Outdoors

W- Work/Chores

E- Engage (with others)

R- Read

When children spend more time on these healthy, screen-free activities, they not only reap the extraordinary benefits these simple activities offer for growing brains and bodies, but they also have less time each day for screens. MORE BRAIN P.O.W.E.R. TIME = LESS SCREEN TIME!

Let's Grow Brain P.O.W.E.R.! offers a simple, memorable framework of shared language that prioritizes healthy child growth and development, gives families a roadmap to healthy development, and educates families about how screen time interferes.

Problem Statement

Childhood screen time is excessive, and research shows it has serious negative effects on growing brains and bodies. By 18 months to 2 years old, 90% of children exceed screen time guidelines. By age 2, 40% of children have their own tablet, and by age 4, that rises to 58%. Tablets are internet-connected, portable devices that provide instant entertainment and distraction. We increasingly see children staring at tablets in shopping carts, at restaurant tables, in waiting rooms, and at home. In fact, 2-year-olds use screens for approximately 2.2 hours per day. By age 5-8, this rises to almost 3.5 hours per day. Teenagers are staring at screens for almost 9 hours per day (Mann et al., 2025).

An ever-growing body of independently funded, robust research links screen time to harm in almost every major area of human health and development, including

[Return to Table of Contents](#)

physical health, mental health, social-emotional well-being, cognitive development, and academic achievement. Research on young children reveals additional concerns about screen time's effects: attachment with caregivers, sleep, language acquisition, emotion regulation, sensory processing, and early brain development are all impaired (Talarico & Carr, 2025).

The sheer volume of studies regarding children's screen use, and the wide range of negative effects, should give everyone who cares for children's well-being a reason to pause. Together, we need to reconsider the culture of screen overuse for children and shift the focus toward healthier developmental activities.

Two studies in particular spurred the creation of the Let's Grow Brain P.O.W.E.R.! framework. In these studies, pediatrician and researcher Dr. John Hutton recruited small cohorts of preschoolers, measured screen use, conducted developmental testing, and examined MRI brain images. Both studies correlated higher screen use with thinning of certain brain structures, especially in areas related to language, literacy, and social skills (Hutton et al., 2020; Hutton et al., 2022). The preschool years are an essential time of learning and growth that can establish patterns for many years. Preschoolers' brains should grow, not thin.

Communicating this information to parents of young children is vital, but difficult. Fear-based messages can create overwhelming feelings of fear or guilt, and reduce parents' confidence in their ability to manage screen time (Fairplay, 2025). However, starting a conversation with a positively framed message helps parents absorb a negative message without harming their confidence (Fairplay, 2025). Let's Grow Brain P.O.W.E.R.! focuses on a positive, empowering message before explaining how screens interfere with healthy development.

Background

Screens are designed and marketed to promote overuse. They have assumed an oversized role in childhood through manipulative design patterns created by an industry focused on profits over children's well-being. Most content has been transformed by addictive algorithms and manipulative design features. Quality programming or apps for children are hard to find, and companies have no incentive to create higher-quality

content. Most of what we all see has been purposely designed to capture and hold our attention and even override our best intentions.

Persuasive design is the science behind the addictive algorithms, the fascinating games, and the never-ending videos and shows. Dr. Richard Freed writes extensively about persuasive design in his book, *Better Than Real Life* (2025). He notes that persuasive design combines psychology and neuroscience with technology, enabling tech designers to embed psychological tricks and neurological hacks into an app to alter a user's thoughts, feelings, and ultimately, their behavior. These design features are scientific, targeted, purposeful, and they are highly successful. We are on screens more than any of us could have ever imagined, and often for longer than we'd like to admit! Dr. Freed explains that tech companies hire psychologists and neuroscientists to devise ways to hook our attention for just a few seconds or minutes longer than we'd like (Freed, 2025). More time on an app attracts more advertisers, which generates more revenue for the company. The business model is simple, but it is wreaking havoc on our children.

Even the youngest users are not protected from this manipulation. One study found that 80% of apps designed for children ages 0-5 contained manipulative design features (Radesky et al., 2022). Because children's brains are not fully developed, they are even less able to resist being held captive to the screen.

A popular children's show provides one example. The show's creators regularly conduct "audience research days" in which they observe toddlers watching an episode of the show. Researchers note each time toddlers look away from the screen, aiming to make those moments in the show more engaging (Segal, 2022). In other words, the show's creators purposefully work to override a toddler's healthy developmental desire *to look at something else*, even just to observe the world around them.

Tech company marketing also encourages screen overuse. They spend millions of dollars to spread the message that children will be hip, safe, social, and smart when they use these products (McLeod, 2025). Reality largely contradicts this message. First, predators and inappropriate content abound online, which undermines children's safety (Kraut, n.d.). Second, communicating and connecting through a screen breeds more

shallow relationships without the rich synchronicity of facial and body cues or shared experience, which undermines children's social-emotional health (Stieger et al., 2023). Lastly, academic achievement worldwide has fallen as personal and learning screens have taken over classrooms, undermining children's cognitive ability (Horvath, 2025). Children might seem hip or cool, but the sacrifices of safety, social-emotional health, and cognitive ability are real.

Excessive Screen Use Interferes with Healthy Development

Once screen time sneaks into a family's life, it disrupts healthy development in four ways: displacement of healthier activities, technoference, overstimulation, and inappropriate content.

Displacement

Childhood is an incredible period of physical, mental, and social-emotional growth. Screen time *displaces* important activities that help children grow and thrive. Children need to experience and practice many physical skills to fully understand their bodies and how they function in the physical world. Time for things like climbing, jumping, and balancing is essential. Children need to learn and practice cognitive skills to expand their cognitive capacity. This includes time for building, doing puzzles, pretending, making up games and rules, and asking questions. Children also need to learn and practice social-emotional skills to understand how to successfully function in the world. This includes time to practice conversations with eye contact, play with or help a friend, or navigate difficult emotions. Finally, children need to learn and practice life skills like putting on shoes, setting a table, or helping with laundry in order to learn to care for themselves and others. These skills require patience, time, and practice.

Even high-quality screen time cannot compete with real-world learning. Children are wired to learn from the physical world around them. Hutton (as cited in Wilkinson, 2024) explains that human brains evolved to do two things really well: process information from the five senses, and interact with other humans. Screens shrink experience into two dimensions and place a physical barrier in relationships. Real-world learning should not be displaced by screens.

Technoference

Technoference happens when technology use interferes with relationships (Children and Screens, 2025). It happens in families and schools, between children, between teens, and even between adults. When we pay attention to a screen while a child is in front of us, we are inadvertently communicating that what's on the screen is more important than the child at that moment. Adults must change this by modeling good screen habits like putting a phone aside during family time and paying full attention to the child in front of us. We all need to remind ourselves (and our kids) to always put people first.

Overstimulation

Our brains were not designed to process the sheer amount of information we encounter daily. For children, it is even more difficult. Lights, sounds, and fast-paced material constantly bombard their brains, and their nervous systems struggle to keep up. This overstimulation can dysregulate biological systems and show up as meltdowns or other behavioral and emotional issues (Dunckley, 2015).

An additional type of overstimulation occurs in the brain's reward pathways. Dopamine is a neurotransmitter related to desire and reward. Interactive screens cause the release of high amounts of "easy" dopamine. Real-life activities generally require more work than screen-based activities and tend to release smaller amounts of dopamine. When children become accustomed to high levels of dopamine in the brain, they crave more of the "easy" dopamine from the screen, and real life can start to feel boring (Freed, 2025). This creates a cycle of screen overuse. Dopamine levels can be "reset," so children can enjoy the "hard-earned" dopamine of real-life activities. Finding joy in little things is one of life's true pleasures!

Content

Poor quality, inappropriate, and extreme content is everywhere online. Over 20 million videos are uploaded onto YouTube each day (YouTube, 2026). It is impossible to vet all this material daily. People with no background in either education or child

development label videos as “educational,” and people with no regard for children’s well-being post harmful content.

Inappropriate content slips through even the best firewalls and content filters, and children easily share material with their peer groups. Harmful content can fuel unhealthy obsessions or relationships, fears, and misinformation.

Appropriate Approaches/Strategies

Shift the Focus to Healthy Development

As noted, families are more likely to hear and trust a positive, empowering message about screen time than a negative or fear-based one (Fairplay, 2025). So, let’s start the conversation by shifting our focus. We all want healthy, thriving children who can grow into healthy, thriving adults. We can focus on what research and lived experience show us about helping children grow and what adults can do to support that process. More P.O.W.E.R. Time = Less Screen Time!

Provide Parents with a Roadmap Toward Healthy Development: P.O.W.E.R. Activities and Human Skills

Children are children. Technology changes, but children’s developmental needs have not. Children need P.O.W.E.R. activities! These screen-free activities provide extraordinary benefits to health and development (Talarico & Carr, 2025). They can be as simple and low-cost as empty boxes and crayons, a patch of dirt, asking for help finding a book at the library (and then reading it together), or helping with chores at home. The following list represents some of the many benefits:

Play: Play improves physical and mental health, builds resilience, and strengthens many foundational skills, such as problem-solving, critical thinking, creative thinking, and communication.

Outdoors: Outdoor time improves physical and mental health, mitigates the negative effects of screen time, strengthens cognition and academic learning, and builds communication and language skills.

Work/Chores: Work and chores build useful life skills, a strong work ethic, self-esteem, resilience to frustration and adversity, and a sense of belonging.

Engage: Engaging with others strengthens language, communication, and interpersonal skills, builds empathy, and creates community.

Read: Reading opens new worlds of knowledge, strengthens focus and attention, increases brain connectivity and the ability to think critically, and builds empathy. Shared reading also strengthens attachment.

These activities help children practice the *human skills* they will need in the future. No matter what the future looks like, and no matter what the new and popular technology of the day is, children will need *human skills* like:

- Problem solving
- Empathy
- Resilience
- Critical thinking
- Creative thinking and
- Social-emotional skills (like communicating and self-regulation)

These abilities help children observe, examine, and interact with the real world and the people in front of them in a positive, beneficial way. As children practice these skills, they become more proficient.

Encourage Practice and Repetition to Grow Brain P.O.W.E.R.

When children engage in healthy activities, they learn valuable skills. For example, when a child rides a scooter, builds a block tower, does a puzzle, reads a book, stirs a pot, sorts laundry, or navigates boredom or disappointment, they are learning.

Children's experiential pursuits correspond with some activity in the brain. When a child learns a new skill or tries a new activity, the brain creates a new pathway. Each time the child practices that skill or activity, the brain reinforces the pathway and makes it thicker, stronger, and faster. This incredible process of brain growth is called myelination. For brains, "myelination is the process by which a fatty substance called

myelin wraps around the axons of neurons, forming an insulating layer that dramatically enhances the speed and efficiency of neural communication” (NeuroLaunch, 2024). Nerve fibers coated in myelin make up much of the brain’s white matter. So, the practice and repetition of skills not only help a child gain proficiency in an activity, but it also spurs the development of white matter in the brain. This is the same white matter that was thinning in Dr. Hutton’s research on preschoolers. Young children learn, and therefore grow white matter, with all activities they practice: from riding a scooter to quietly looking at a book, to engaging in a conversation or moving through disappointment. Repetition grows brain power.

Use it or Lose it

Growing brain matter requires experiences and practice. If a child doesn't practice a skill, the brain pathway stays weak and slow, and the skill stays difficult. Interestingly, brains go through several periods of “pruning” in childhood and adolescence. During these periods, the brain prunes away underutilized pathways. The adage “use it or lose it” rings true for brain development.

Educate About How Screens Interfere with Healthy Development

After empowering families to add more healthy developmental activities into everyday life, we can begin to educate them about how screen overuse causes harm.

Conclusion

Screen-based activities will never provide as much learning as three-dimensional, sensory-rich, synchronous, and in-person activities. The P.O.W.E.R. activities: play, outdoor time, work/chores, engaging with others, and reading, lead children into the three-dimensional, sensory-rich physical world and allow them to practice the human skills that will help them in the future.

Screen overuse is interfering with children’s healthy development, including physically, mentally, socially, emotionally, cognitively, and academically. Providing a child with a device might calm and entertain them in the moment, but it also displaces the real-life learning that children need to grow and thrive. Families receive conflicting information about screen time and are often unsure of how to proceed. We must provide

families with a path forward without blame or shame. When families include more P.O.W.E.R. activities in the day, screen time will naturally be reduced. Small changes can have a big impact on development. As families learn about how screen time affects their growing child, they can make more changes when they are ready.

Let's Grow Brain P.O.W.E.R.! provides a simple, memorable framework that promotes healthy developmental activities, encourages healthy change, and explains how screen overuse interferes. Let's Grow Brain P.O.W.E.R.!

References

Children and Screens. (2025). *What is technofence?*

<https://www.childrenandscreens.org/learn-explore/research/what-is-technofence/>

Dunkley, V. (2015). *Reset your child's brain*. New World Library.

Fairplay. (2025). *Hooked from birth: Promoting structural change and avoiding parental shame in the battle to reduce early childhood screen time*.

[https://fairplayforkids.org/wp-content/uploads/2025/08/UPDATED-JULY-2025-Fairplay-Early-Childhood-Screen-Time-White-Paper-FINAL .pdf](https://fairplayforkids.org/wp-content/uploads/2025/08/UPDATED-JULY-2025-Fairplay-Early-Childhood-Screen-Time-White-Paper-FINAL.pdf)

Freed, R. (2025). *Better than real life: The secret science addicting kids to screens and how to save childhood*. Creekside Books LLC.

Horvath, J. C. (2025). *The digital delusion: How classroom technology harms our kids' learning and how to help them thrive again*. LME Global.

Hutton, J. S., Dudley, J., Horowitz-Kraus, T., DeWitt, T., & Holland, S. K. (2020).

Associations between screen-based media use and brain white matter integrity in preschool-aged children. *JAMA Pediatrics*, 174(1).

<https://jamanetwork.com/journals/jamapediatrics/fullarticle/2754101>

Hutton, J. S., Dudley, J., DeWitt, T., & Horowitz-Kraus, T. (2022). Associations between digital media use and brain surface structural measures in preschool-aged children. *Scientific Reports*, 12(1). <https://www.nature.com/articles/s41598-022-20922-0>

- Kraut, M. E. (n.d.). *Children and grooming/online predators*. Child Crime Prevention & Safety Center. <https://childsafety.losangelescriminallawyer.pro/children-and-grooming-online-predators.html>
- Mann, S., Calvin, A., Lenhart, A., & Robb, M. B. (2025). *The Common Sense census: Media use by kids zero to eight, 2025*. Common Sense Media. <https://www.commonsensemedia.org/sites/default/files/research/report/2025-common-sense-census-web-2.pdf>
- McLeod, M. (2025). *Grow Now ADHD*. <https://www.grownowadhd.com/>
- NeuroLaunch Editorial Team. (2024, September 30). *Myelination in the human brain: From development to adulthood*. NeuroLaunch. <https://neurolaunch.com/myelination-in-the-human-brain/>
- Radesky, J., Hiniker, A., McLaren, C., et al. (2022). Prevalence and characteristics of manipulative design in mobile applications used by children. *JAMA Network Open*, 5(6). <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2793493>
- Segal, D. (2022, May 5). *A kid's show juggernaut that leaves nothing to chance*. *The New York Times*. <https://www.nytimes.com/2022/05/05/arts/television/cocomelon-moonbug-entertainment.html>
- Stieger, S., Lewetz, D., & Willinger, D. (2023). Face-to-face more important than digital communication for mental health during the pandemic. *Scientific Reports*, 13, Article 8022. <https://www.nature.com/articles/s41598-023-34957-4>
- Talarico, K., & Carr, K. (2025). *Research. Let's Grow Brain P.O.W.E.R.* <https://www.letsgrowbrainpower.com/research>
- YouTube. (2026). *YouTube for press*. <https://blog.youtube/press/>
- Wilkinson, H. (Host). (2024, February 7). *What's the matter? How baby and toddler brain development is affected by screen time // John S. Hutton, MD* (Season 9, Episode 1) [Audio podcast episode]. In *Healthy Screen Habits*.

<https://www.healthyscreenhabits.org/s9-episode-1-whats-the-matter-how-baby-and-toddler-brain-development-is-affected-by-screen-time-john-s-hutton-md>

The Algorithm in the “Toy Box”: Navigating AI, Play, and Culture

Jessie Ming Sin Wong, PhD

Introduction

Toys are a universal and essential part of childhood. They are tools of play, props for imagination, and objects through which children make sense of their world. Foundational theories of development demonstrate that object play is not just common but essential for cognitive growth. Toys serve as critical pivots for developing abstract thought and are the primary instruments through which children build symbolic understanding (Piaget, 1962; Vygotsky, 1978). The right toys, introduced at the right time, can promote healthy development and create rich learning opportunities (Dauch et al., 2018).

For millennia, these toys remained relatively constant. They were dolls, blocks, and balls, crafted from wood, clay, and rock (Chrisp, 1996). Today, the “toy box” looks very different. We have entered the era of the “smart toy,” an era where playthings can listen, respond, learn, and connect to the internet. Artificial intelligence (AI) has moved from research labs into our children’s playrooms as interactive robots, adaptive learning games, and voice-activated companions (Holmes et al., 2019; Lee et al., 2024; Su & Yang, 2022). These new toys offer incredible promise, with the ability to personalize experiences and foster new skills (Snooplay, 2024). They also introduce profound new challenges that touch upon the very culture of childhood. This white paper explores the complex relationship between AI, play, and culture, offering guidance for parents and educators to navigate this evolving landscape thoughtfully and protect every child’s right to meaningful play.

Problem Statement

A New Kind of Playmate. The arrival of AI in the “toy box” presents a double-edged sword. On one side, these technologies can create deeply engaging and educational play. An AI tutor can adapt to a child’s specific learning pace, and an interactive robot can encourage creative problem-solving (Kewalramani et al., 2021; Lee

et al., 2024). On the other hand, these same toys raise urgent questions about development, privacy, and culture that we are only beginning to confront.

The core problem is this: AI toys are not just passive objects. They actively shape a child's experiences, values, and worldview. This creates several critical issues:

- ***The problem of culture:*** Whose culture do these toys teach? AI systems learn from vast datasets, which often reflect a single, dominant cultural perspective. This happens because the most readily available data on the internet comes predominantly from Western, English-speaking sources. A 2024 UNESCO report found that major AI models produce content with significant gender and racial biases, associating women with domestic roles and producing richer, more positive narratives for men (UNESCO & IRCAI, 2024). For a child, this is not an abstract problem. It means the AI storytelling app might generate only tales with fair-skinned princesses waiting for a prince, or the robot companion may not understand a name outside its pre-programmed norms. When a toy's stories, jokes, and characterizations reflect these biases, it communicates to children that some voices, faces, and traditions are more valuable than others, potentially harming their sense of identity and belonging.
- ***The problem of relationships:*** Does the toy replace a friend? Smart toys are designed to be engaging and can create strong emotional bonds. This can be beneficial, but it also risks a child preferring an ever-agreeable AI companion over navigating the complex, messy, and essential work of real human friendship (Serholt et al., 2022). Human interaction teaches invaluable skills, such as reading nonverbal cues, managing conflict, developing empathy, and experiencing the shared joy of a joke understood. An AI companion, which cannot truly feel or disagree in a meaningful way, offers a simplified, frictionless version of connection. Over-reliance on such interactions may hinder the development of social resilience, leaving a child less prepared for the complexities of real-world human relationships. This can lead to what some have called a "solitariness of childhood," where play becomes more private and less social (Sutton-Smith, 1994).

- ***The problem of privacy:*** Who is listening to your child's play? Many smart toys require an internet connection to function and collect data on a child's conversations, habits, and progress. This data is a valuable commodity. Companies can use it to build detailed consumer profiles of children before they are old enough to understand what a consumer is. The U.S. Federal Trade Commission (FTC) has updated its rules to limit how companies can monetize children's data, but the risks of data breaches and misuse remain significant (FTC, 2025; Snaveley & DeVaney, 2025). This surveillance-based model of play raises serious ethical questions about the commercialization of childhood and a child's right to a private inner world where they can speak and imagine freely without being recorded and analyzed.

Background

From Sticks to Silicon.

The history of toys is inextricably linked to the history of human culture. The earliest toys were often found in nature, such as rocks and sticks (Chrisp, 1996). For centuries, most toys were homemade. The Industrial Revolution brought the first wave of mass-produced commercial toys, making them more widely available. After World War II, the toy industry grew significantly, thanks to the advent of plastic and metal, which made it possible to produce cheaper, more common toys, such as Lego bricks. Even with this commercialization, folk toys that reflected a child's local culture remained common in many parts of the world (Koong & Wong, 2018).

The last two decades have brought a more radical transformation. The rise of digital technology and global media has fundamentally changed what a toy is (Yelland, 1999). Today, the global smart toy market is a massive industry, valued at over 19 billion U.S. dollars in 2024 and growing rapidly (Singh & Singh, 2024). Unlike the folk toys that often reflected local traditions, these new smart toys are frequently designed by a handful of global corporations, raising new questions about cultural representation. They are not just toys with batteries. They are complex devices with sensors, microphones, and processors that use AI to create interactive experiences. This shift

from simple, child-powered play to complex, algorithm-driven interaction represents one of the most significant changes to the landscape of play in human history.

Appropriate Approaches/Strategies

Navigating this new reality doesn't require rejecting technology; it requires adapting to it. It requires intentionality. Parents and educators can become critical, informed consumers who harness AI's benefits while protecting children from its risks. Here are some practical strategies:

- ***Become a “culture curator” for the “toy box”:*** Your role is to ensure your child’s playthings reflect your family’s values and the diversity of the world.
- ***Ask about diversity:*** Before buying a smart toy, investigate the stories it tells and the characters it features. Ask if it supports multiple languages or if its content can be customized to reflect different cultural traditions. Look for companies that are transparent about their commitment to creating inclusive content.
- ***Seek out diverse creators:*** Look beyond the big-box stores. Many smaller companies and startups are founded by individuals from diverse backgrounds who are creating more culturally representative toys and apps. Supporting them can help foster a healthier, more inclusive market.
- ***Co-play and correct:*** Play with your child and their AI toys. When the toy introduces a stereotype or a biased idea, use it as a teaching moment. Talk with your child about what you heard and why you see it differently. This builds essential media literacy skills.
- ***Supplement with your culture:*** Use technology to share your own heritage. Record yourself telling family stories for your child to listen to, or use tablets to show them pictures and videos of relatives and cultural celebrations (Wong, Accepted).
- ***Champion a “balanced play diet”:*** Digital play should be one part of a healthy and varied play experience, not the whole meal.
- ***Prioritize unplugged play:*** Ensure your child has plenty of time for unstructured, imaginative play with traditional, open-ended toys like blocks, art

supplies, and dolls. This kind of play is crucial for developing creativity and problem-solving skills.

- **Protect social play:** Encourage and facilitate playdates with other children. No AI, no matter how advanced, can replace the developmental benefits of learning to share, negotiate, and empathize with a human peer.
- **Embrace boredom:** Do not feel the need to fill every moment with stimulation. Boredom is often the engine of creativity. In the quiet moments, when a child has “nothing to do,” they are most likely to invent a new game, daydream a fantastic story, or see their old toys in a new light. Highly engaging AI toys are often designed to eliminate boredom, but in doing so, they can rob children of these vital creative opportunities.
- **Set clear boundaries:** Establish firm rules around screen time and the use of digital toys. Technology should have a clear “off” switch, especially during family meals, before bedtime, and during outdoor play. This helps children learn to self-regulate their technology use.
- **Ask the hard questions about privacy:** You have a right to know what data a toy collects and how that data is used.
- **Read the privacy policy:** Before purchasing, look for the toy’s privacy policy online. Look for clear, simple language. If you cannot find it or do not understand it, that is a red flag.
- **Ask who the company shares data with:** Check whether the company shares or sells data to third parties for advertising or other purposes. The Children’s Online Privacy Protection Act (COPPA) provides a baseline of protection, but many state laws are now adding further restrictions (Thomson et al., 2025; Waite, 2025).
- **Demand control:** A good product will give you, the parent, control. You should be able to access and delete any data the company has collected on your child.
- **Manage the device itself:** Take control of the hardware. A simple piece of tape over a camera lens when not in use is a low-tech but effective precaution. Likewise, learn how to turn off the microphone in your device’s settings and only enable it during active play.

Conclusion/Recommendations

AI is a powerful new force in the world of play. It can offer children personalized, engaging, and educational experiences that were unimaginable a generation ago. However, without careful guidance and critical oversight, these same technologies risk promoting a homogenized global culture, replacing vital human relationships, and compromising a child's fundamental right to privacy. The path forward is not to ban these new tools, but to engage with them wisely. We must shift the conversation from what a toy can do to what it *ought* to do in the service of a child's holistic development.

To ensure that AI serves play, and not the other way around, this white paper offers the following recommendations:

1. ***For parents and caregivers:*** Embrace your role as a media mentor and culture curator. Actively choose toys that reflect your family's values, play alongside your child to guide his or her experience, and champion a balanced diet of play that prioritizes social, outdoor, and imaginative activities.
2. ***For educators:*** Integrate technology with clear pedagogical goals. Use AI as a tool to support learning, not as a replacement for teacher-led instruction. Model critical thinking by discussing with students how these tools work and the biases they might contain.
3. ***For the toy industry:*** Adopt an "ethics by design" approach. Prioritize children's developmental needs and cultural affirmation over engagement metrics. Provide radical transparency in privacy policies and give parents meaningful control over their children's data.
4. ***For play advocates and policymakers:*** Champion stronger, clearer regulations that protect children's data and hold companies accountable for algorithmic bias. Support the development of independent rating systems that can help parents evaluate the ethical and cultural quality of smart toys.

The "toy box" has changed forever. It is our collective responsibility to ensure that even as toys become smarter, our approach to play remains wise, humane, and dedicated to the flourishing of every child.

References

- Chrisp, P. (1996). *History of toys and games*. Hodder Wayland.
- Dauch, C., Imwalle, M., Ocasio, B., & Metz, A. E. (2018). The influence of the number of toys in the environment on toddlers' play. *Infant Behavior and Development*, 50, 78–87. <https://doi.org/10.1016/j.infbeh.2017.11.005>
- Federal Trade Commission. (2025, January 16). *FTC finalizes changes to Children's Privacy Rule limiting companies' ability to monetize kids' data* [Press release]. <https://www.ftc.gov/news-events/news/press-releases/2025/01/ftc-finalizes-changes-childrens-privacy-rule-limiting-companies-ability-monetize-kids-data>
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Kewalramani, S., Kidman, G., & Palaiologou, I. (2021). Using artificial intelligence (AI)-interfaced robotic toys in early childhood settings: A case for children's inquiry literacy. *European Early Childhood Education Research Journal*, 29(5), 652–668. <https://doi.org/10.1080/1350293X.2021.1968458>
- Koong, M., & Wong, J. M. S. (2018). Children with toys. In World OMEP (Ed.), *Children of the world: 70 years of OMEP in photographs* (pp.100–103). Changjisa Publishing Co.
- Lee, J., Jo, J., Lee, J. O., & Kim, S. H. (2024). Incorporating humanoid artificial intelligence (AI) robots into early childhood education. *Early Childhood Education Journal*. Advance online publication. <https://doi.org/10.1007/s10643-024-01690-0>
- Piaget, J. (1962). *Play, dreams and imitation in childhood* (C. Gattegno & F. M. Hodgson, Trans.). W. W. Norton & Company. (Original work published 1945)
- Serholt, S., Ekström, S., Küster, D., Ljungblad, S., & Pareto, L. (2022). Comparing a robot tutee to a human tutee in a learning-by-teaching scenario with children. *Frontiers in Robotics and AI*, 9, Article 836462. <https://doi.org/10.3389/frobt.2022.836462>

- Singh, A., & Singh, S. (2024). *Smart toys market - By product type, by technology, by age group, by price, by end use, by distribution channel analysis, share, growth forecast, 2025 - 2034*. <https://www.gminsights.com/industry-analysis/smart-toys-market>
- Snaveley, N. B., & DeVaney, B. R. (2025, January). *Youth online privacy in 2024 and beyond*. <https://www.redgravellp.com/publication/youth-online-privacy-in-2024-and-beyond>
- Snooplay. (2024). *Exploring the impact of AI toys on child development: Benefits, risks & ethical considerations*. <https://snooplay.in/blogs/news/exploring-the-impact-of-ai-toys-on-child-development-benefits-risks-and-ethical-considerations>
- Su, J., & Yang, W. (2022). Artificial intelligence in early childhood education: A scoping review. *Computers and Education: Artificial Intelligence*, 3, Article 100049. <https://doi.org/10.1016/j.caeai.2022.100049>
- Sutton-Smith, B. (1994). Does play prepare the future? In J. H. Goldstein (Ed.), *Toys, play, and child development* (pp. 130–146). Cambridge University Press. <https://doi.org/10.1017/CBO9780511527616.008>
- Thomson, A. C., Waltzman, H. W., Allen, K., & Von Klein, M. P. (2025, February 25). *Children's online privacy: Recent actions by the States and the FTC*. <https://www.mayerbrown.com/en/insights/publications/2025/02/protecting-the-next-generation-how-states-and-the-ftc-are-holding-businesses-accountable-for-childrens-online-privacy>
- UNESCO & IRCAI (2024). *Challenging systematic prejudices: An investigation into gender bias in large language models*. <https://unesdoc.unesco.org/ark:/48223/pf0000388971>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Waite, J. (2025). *Children's privacy laws US*. <https://evalian.co.uk/childrens-privacy-laws-us/>

- Wong, J. M. S. (Accepted). Between YouTube and AI: Parental perspectives on technology in early childhood national identity education. In *ICEEL '25: Proceedings of the 2025 9th International Conference on Education and E-Learning*. ACM.
- Yelland, N. (1999). Technology as play. *Early Childhood Education Journal*, 26, 217–220. <https://doi.org/10.1023/A:1022907505087>